

OCTOBER, 1944

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THE

Refrigeration

INSTALLATION
MAINTENANCE
MERCHANDISING

Industry

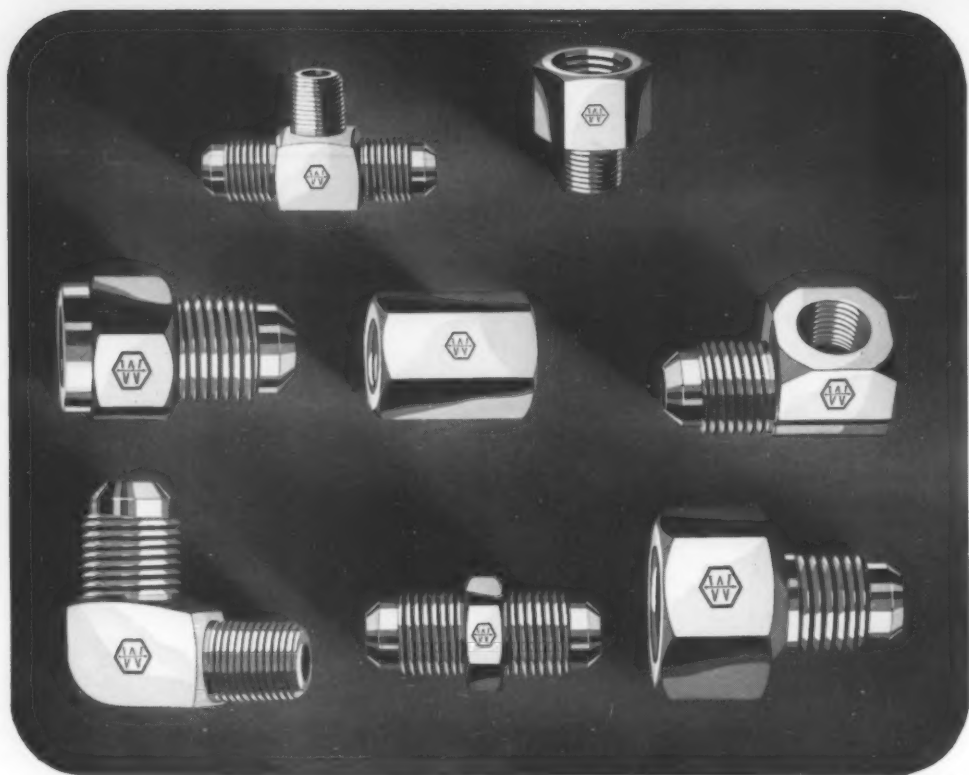
AIR CONDITIONING
MACHINERY



VOA

IN THIS ISSUE:

{ Goal to Go! . . . Put a Tester on Your Overhead Refrigeration: Keystone of Plasma Production Hot and Cold for the AAF . . . Condenser Cleaning



Flare fittings

for the refrigeration industry!

Flare-type fittings, because of their widespread use and standardization of design, are used extensively in all types of commercial and domestic refrigeration units. Weatherhead flare fittings are particularly easy to assemble since they feature sharp, clean threads and oversize wrench pads that make possible easy installation and use in tight corners. Like all Weatherhead fittings they come in a wide variety of types and sizes—brass, and steel.

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Weatherhead

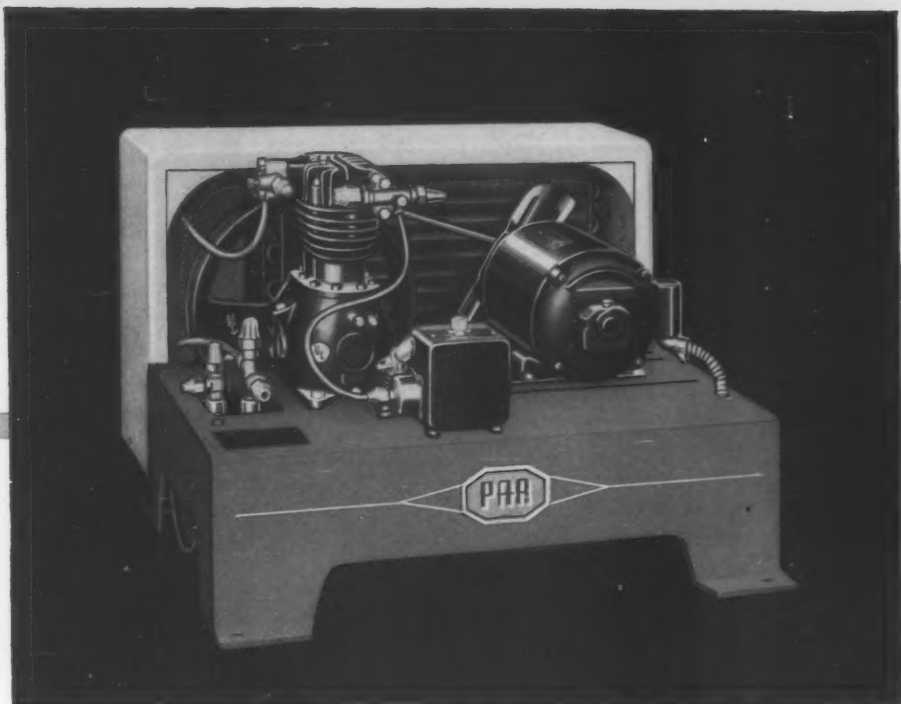
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V O A



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USE**

IMPERIAL

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Dehydrators ★ Filters ★
Floats ★ Charging Lines
★ Tools for cutting, flaring,
bending, coiling, pinch-off and swedging.

THE *Refrigeration* INDUSTRY

VOLUME 1, No. 5

OCTOBER, 1944

The Refrigeration Industry

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ERATION PUBLICATIONS,
INC., Cleveland, Ohio.
Published Monthly by RE-
FRIGERATION PUBLICA-
TIONS, INC., Cleveland, Ohio.
IRVING B. HEXTER, Pres.
LESTER P. AURBACH, V.Pr.

CONTENTS

THE COVER . . . Faces tense, Marines on a South Pacific beach watch plasma pump life back into the veins of a wounded comrade. Refrigeration makes possible mass production of this miracle fluid.
Marine Corps photo from American Red Cross.

	Page
BTU'S	
The industry's news, views, and trends	15
GOAL TO GO!	
A neighborhood dealer marks time for postwar	17
HOT AND COLD FOR THE A A F	
A twelve-temperature job for testing work	18
PUT A TESTER ON YOUR OVERHEAD	
Hit-and-miss figures won't work from now on	20
SAFE AND SIMPLE WATER SCALE REMOVAL	
Time and trouble-saving tips on condenser cleaning	22
REFRIGERATION: KEYSTONE OF PLASMA PRODUCTION	
Controlled temperatures make mass production possible	24
HERE'S HOW	
The service man's department—how to do it	28
OVER THE COUNTER	
Jobbers' salesmen discuss current problems	34
ABOUT PEOPLE	37
USEFUL LITERATURE	
New printed material available to readers	40
THE MARKET PLACE	
Classified advertising section	44
PRACTICAL ENGINEERING MANUAL AND REFERENCE LIBRARY	
Part IV—Selecting condensing units	45
NEW PRODUCTS	
New developments in equipment and engineering	48

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For Instantaneous Pressure Relief with Fast and Positive Reseating

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This valve is recommended for protection to a system containing a large charge of freon or methyl chloride refrigerant. It may be employed either for relieving high side or low side to atmosphere. It can also be installed so as to relieve from high to low side of system. It meets the requirements of all existing safety codes. Due to its acknowledged efficiency through dependable performance under all conditions of service, the Henry Diaphragm Relief Valve is today widely used in refrigeration and air conditioning installations of the Army, Navy and Maritime Commission.

The Henry Diaphragm Relief Valve is available in $\frac{1}{2}$ " F.P.T., $\frac{3}{4}$ " F.P.T., $\frac{1}{2}$ " O.D. and $\frac{3}{4}$ " O.D. Solder connections and at pressures ranging from 90 pounds to 300 pounds per square inch. Each valve is individually adjusted, set at pressures ordered and marked with its rated free air passage capacity per minute. Locking device prevents tampering with pressure setting or changes in setting due to vibration.



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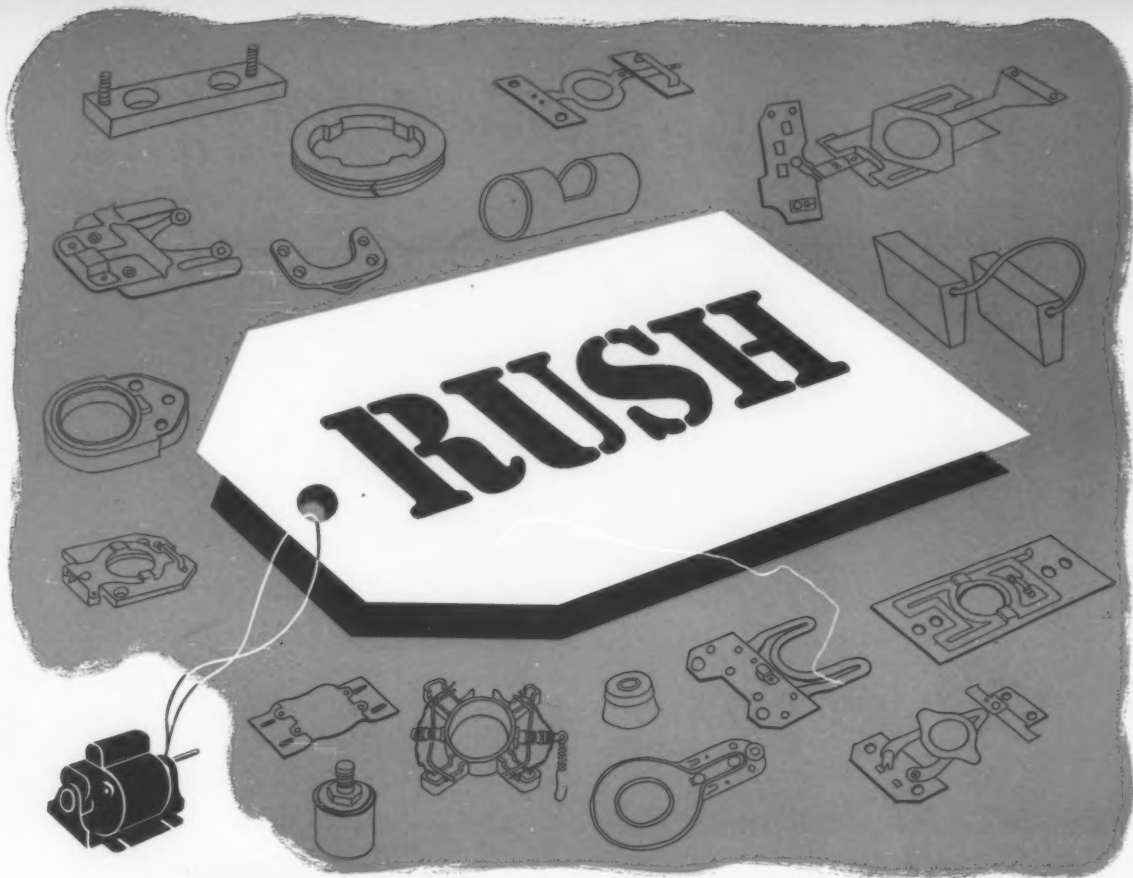


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- 1 **BOND COMMITTEE**—Appoint a 6th War Loan Bond Committee from labor, management and each representative group of the firm.
 - (b) Pre-drive letter to employees from management and labor.
 - (c) Competitive progress boards.
 - (d) Meeting schedules, etc.
- 2 **TEAM CAPTAINS**—Select a team captain, for each 10 workers, from men and women on the payroll—but not in a supervisory capacity. Returned veterans make most effective captains.
- 3 **QUOTA**—Set a quota for each department and each employee.
- 4 **MEETING OF CAPTAINS**—Give a powerful presentation of the importance of the work assigned to them. Instruct them in sales procedure. Have them carefully study the Treasury Booklet, *Getting the Order*.
- 5 **ASSIGNMENTS**—Assign responsibilities for:
 - (a) Music, speeches and announcements of the opening rally.
- 6 **CARD FOR EACH WORKER**—Dignify each personal approach with a pledge, order, or authorization card made out in the name of each worker. Provide for a cash purchase or installment pledge. Instruct each captain to put a pencil notation on the card to indicate the subscription he expects to solicit from each worker.
- 7 **RESOLICITATION**—People don't mind being asked to buy more than once. Resolicit each employee toward the end of the drive in a fast mop-up campaign. Call upon your State Payroll Chairman; he's ready with a fully detailed plan—NOW!
- 8 **ADVERTISE THE DRIVE**—Use all possible space in the regular media you employ to tell the War Bond story.

The Treasury Department acknowledges with appreciation the publication of this message by

THE REFRIGERATION INDUSTRY

This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council

A FILTERING ELEMENT IS NOT ONLY DESIRABLE BUT IMPERATIVE IN AN EFFICIENTLY OPERATING DEHYDRATOR

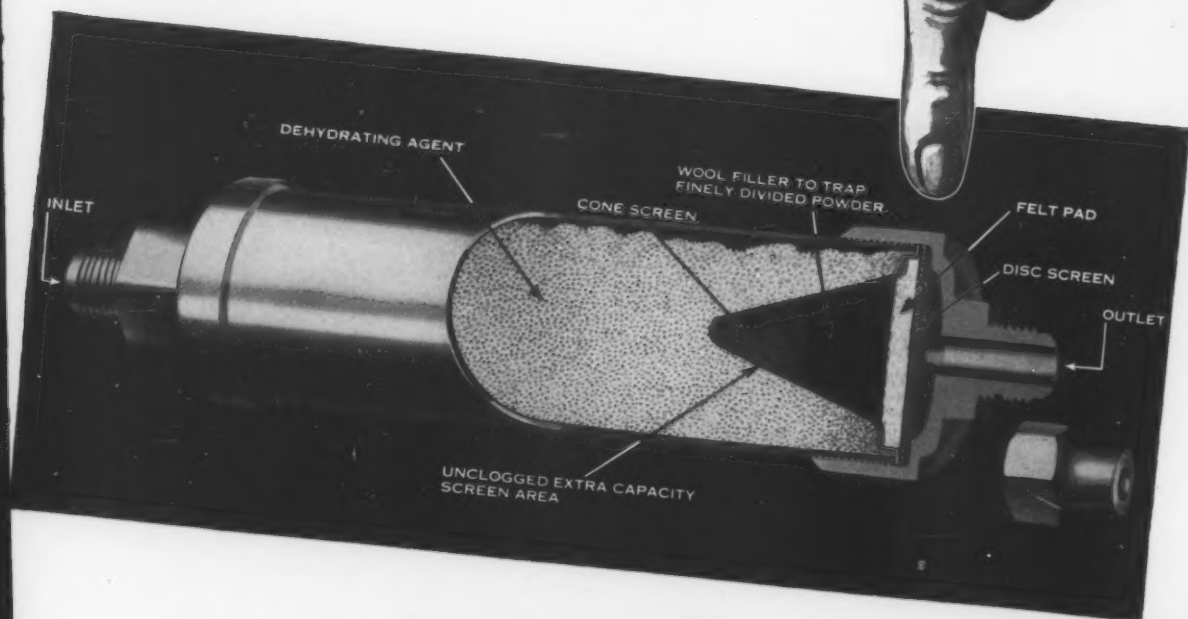
Mueller Brass Co. Filters and Driers feature the CONE SCREEN OUTLET, a specially designed filtering element that adds immeasurably to the life and efficiency of driers and filters.

Almost all crystalline dehydrating agents are subject to a certain amount of abrasion while a dehydrator is in service. Small portions of the dehydrating agent break down into very fine powder and crystals. Unless a well-designed filtering element is incorporated in a dehydrator, these fine crystals and powder have a tendency to clog the outlet filter, resulting in restriction to the flow of refrigerant.

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In addition, the cone screen is filled with pure wool which traps such particles that are sufficiently fine to pass through the screen mesh.

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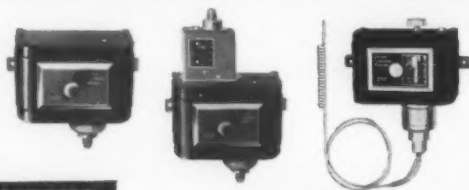
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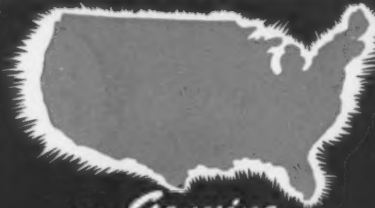
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THE REFRIGERATION INDUSTRY



V-DAY MINUS 1 MINUTE

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What has blood plasma to do with your food supply?

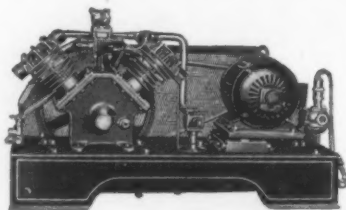
They both are in the fight for freedom! Blood plasma is worthless unless it is kept at a low, controlled temperature from the time it is drawn from a donor's veins—processed at a laboratory—transported—and held to the period immediately preceding its life-saving injection.

The men, who are entrusted with the responsibility of producing and protecting our food supply, know the vast amount of annual food waste caused by improper or insufficient refrigeration. They know that the health of both civilians and service men depends upon wholesome food...food protected against spoilage and bacteria by proper refrigeration. And they know that a dependable food supply makes possible increased blood donations.

Brunner condensing units and refrigeration equipment are reliably preserving vital blood plasma and perish-

able foods. Their reliability and efficiency have been proved under the most severe war conditions. Their dependability is a valuable asset to those responsible for the preservation of our food supply whether in large quantities or small.

When confronted with any refrigeration problem, Brunner engineers, experts in the application of all types of refrigeration, will be glad to answer your questions. Naturally, there is no obligation. Brunner Manufacturing Company, Utica, N.Y., U.S.A.



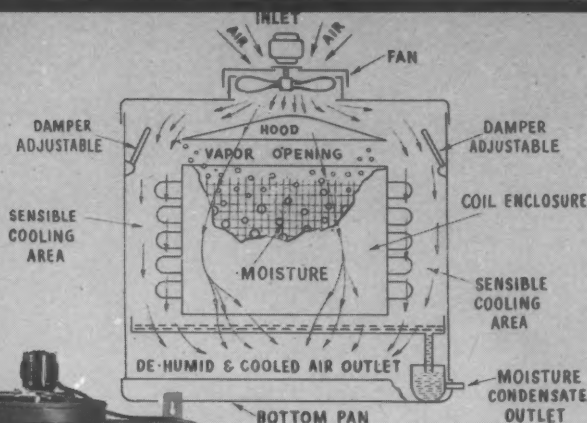
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NOW YOU SEE IT ON THE *INSIDE*

—the sensational **AMCOIL Comfortaire**



**REMOVES
THE MOISTURE
CONTENT OF AIR
WITHOUT TOO MUCH
CHANGE IN
TEMPERATURE**



LICENSED UNDER
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BRINGS LOW-COST DEHUMIDIFICATION TO THESE INDUSTRIES

The Amcoil Comfortaire meets the need for inexpensive dehumidification equipment in such fields as...

Parachute Storage	Paper Storage	Nylon & Silk Industry
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Among other industrial applications, it can be used as a liquid and water reclaimer in aircraft, ships, lifeboats.

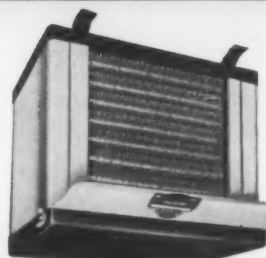
"How does it work?" . . . that's one of the first questions every refrigerating engineer asks about a new air conditioning development such as the Amcoil Comfortaire conditioner announced last month. The diagrammatic drawing shown above gets to the heart of the matter, gives the key answer. In it you see that *recirculated air while passing through the Comfortaire does not come into contact with the cooling coil.*

That's why, as you can readily see, dehumidification takes place without appreciable loss in temperature . . . why this new Amcoil unit removes moisture or latent heat while sensible heat is variable. Comfortaire creates dry, healthful, non-shock comfort at a quarter of the operating cost of expensive reheat systems. Comfortaire can be furnished in completely automatic wall mounted models which may be connected to water cooled condensing units.

ADDITIONAL AMCOIL UNITS *meet any refrigeration requirement*



AMCOIL FOOD CONDITIONER. A wall mounted unit combining high, controlled humidities up to 85% with temperatures of from 35° to 40° F. Designed for walk-in boxes it automatically preserves foods without dehydration. Can be used effectively to store meats, fruits and vegetables, butter, cheese, eggs, flowers, bakers and confectioners products, to retard dough, etc.



AMCOIL ALSERVICE OPEN FACE COOLING UNIT. Is designed for efficient cooling and serves as a general utility unit in preserving foods and other commodities where a forced draft cooling unit is required. Streamlined design, in attractive grey and black color scheme, it can produce temperatures down to 34° F.



AMCOIL ALSERVICE DOWN DRAFT COOLING UNIT. Is a new idea in refrigeration. It is a straight cooling unit that, should the need for humidity control arise, by the addition of certain parts, the unit is converted into a cooling and high controlled humidity FOOD CONDITIONER with all the advantages of that equipment.



AMERICAN COILS CO.

25-27 LEXINGTON STREET - NEWARK 5, N. J.

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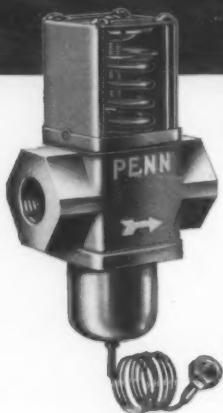
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You can't see them

but they're here!



the DESTRUCTIVE THREE that cripple water valves

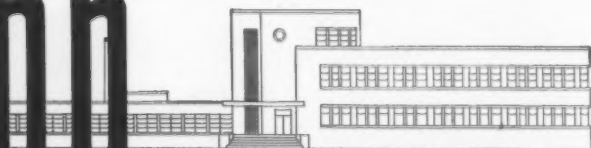
Wherever you find water, there you'll find the Destructive Three—*Sedimentation, Corrosion and Rust*. They've crippled many a water valve, these three . . . but not the PENN 246! That's because this new water regulator is so designed that *no sliding parts touch the water*.

Thus PENN has put a stop to sticking valve seats, rusty range springs and the abrasive desposits that cause early wear.

Water hammer is gone, too . . . yet the PENN 246 is extremely sensitive to changes in refrigerant head pressure. It's available in two types—flanged and threaded—both of which allow for *manual flushing*.

Full details on this new PENN Water Regulator are available without cost in your copy of Bulletin R-1986. Write *Penn Electric Switch Co., Goshen, Ind.* Export Division: 13 E. 40th Street, New York 16, U.S.A. In Canada: Powerlite Devices, Ltd., Toronto, Ont.

PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

BTU

News • Laws • Trends

PRICING PREVIEW

BECAUSE tendencies toward inflation will continue and possibly increase during the reconversion period, price controls will continue during that time, OPA Administrator Chester Bowles has declared.

Prices on consumer goods may vary for the same type of equipment, he said, depending on whether the plant concerned was fully or partially converted to civilian production. Plants still in war production might be considered at an advantage from a cost standpoint.

Since the general price level now is about 10 per cent higher than in 1942, an item coming on the market at about 10 per cent above 1942 prices would be considered at about the same level, Mr. Bowles said.

At present, OPA leans toward the removal of price controls on an industry-by-industry basis, rather than waiting until all such controls could be lifted at one time.

CASES FOR CIVILIANS

POSSIBILITY of an early resumption of the manufacture of commercial refrigeration equipment for civilian use was foreseen by members of the Commercial Refrigeration Manufacturers Association at their annual meeting recently.

C. V. Hill, Jr., of C. V. Hill & Co., was re-elected president of the organization, and the executive committee is comprised of A. J. Johnson, Puffer-Hubbard Mfg. Co.; J. H. Coolidge, Sherer-Gillett Co.; Charles Dieringer, Federal Store Equipment Co., and W. B. McMillan, Hussmann-Ligonier.

On the post-war planning committee, named at the meeting, are: Mr. McMillan, chairman; Jerry Tyler, Tyler Fixture Corp.; J. W. Hart, McCray Refrigerator Co., and Mr. Coolidge, with W. J. Stelpflug of Hussmann-Ligonier as counsellor.

MORE FREON

EFFECTIVE September 30, restrictions have been lifted on the use of "Freon-12" for so-called "essential purposes" such as the preparation of food and industrial refrigeration. Those restrictions originally were scheduled to expire August 31.

However, air conditioning and refrigeration systems included in List "A" of Order M-28 remain under restriction. These systems are those used for comfort air conditioning, ice skating rinks and refrigeration systems used for storing and dispensing beverages.

The new plant of Kinetic Chemicals at East Chicago, Ind., was completed on schedule, and when in full operation is expected to produce enough "Freon-12" to sup-

port the entire aerosol program for the armed services. This will relieve much of the previous load on the Carney's Point, N. J., plant, from which small cylinder shipments are made. For the present, the new Indiana plant is shipping in one-ton drums on multiple tank cars.

For the armed services, and possibly for West Coast non-military users, a plant now building at Stege, Calif., will load small cylinders from one-ton drums.

One thing which may halt increased civilian "Freon" supplies is the hydrofluoric acid situation, which may become short because of increased demand for this chemical in the iso-butane program.

L-38 REVISION

HERE, in summary form, is the substance of the most recent changes in Order L-38:

General restrictions on the sale of this equipment are substantially the same as those which have been in effect previously, but the framework of the Order has been revised to permit prompt relaxation of restrictions as materials become more plentiful.

All four lists in the previous order have been eliminated, and there is no longer a schedule of "permitted uses". For the present, however, applications will be granted only if they conform with the "essential uses" listed in the previous Order.

A preference rating of AA-5 or higher is required for the purchase of all new air conditioning and refrigeration equipment. MRO ratings may be used only for the replacement of worn out equipment which has been in the purchaser's possession for at least 90 days.

Applicants who are permitted to use AA-1 ratings for their MRO requirements, however, may use those ratings for minor capital additions within approved limits.

The use of forms WPB-2448 and WPB-2449 has been discontinued, and all future applications will be filed on forms WPB-1319 or WPB-617.

Distributors or dealers who need new equipment for inventory should extend their customers' ratings, and may apply on form WPB-547 to get additional inventory, if they buy from producers, or WPB-541, if they buy from distributors.

A rated order is not necessary when a repairman under CMP-9A or P-126 installs any part in repairing a system for a farmer or householder, if he merely replaces a part which has become worn out or damaged beyond repair after it has been in use for at least 90 days. All other users, however, must furnish an AA-5 or higher.

A rated order also is not necessary to deliver a complete new farm milk cooler, or a system to be used in a milk cooler owned by a farmer, when the buyer has

Continued on page 46

Still another reason . . .



WHY ALCO VALVES GIVE YEARS OF TROUBLE-FREE SERVICE

You have seen, in previous messages in this series, various tests that combine to assure you of years-long, trouble-free service from Alco Valves.

Here is still another test through which every Alco Thermo Expansion Valve must go before leaving our plant. It checks the "liquid side" of the valves—the underside of the diaphragm, body-diaphragm joint and gear adjustment stem—for leaks.

Valve assemblies, four at a time, are immersed in the tank of the special test fixture designed by Alco engineers. Then air pressure, 50 per cent and more higher than any refrigerant pressure the valves would handle in actual service, is shot into them. Even a single pin-point bubble in the solution means rejection.

That's why we can say—"When an Alco Valve is tested, it *stays tested*." Alco Valve Company, 843 Kingsland Avenue, St. Louis 5, Missouri.



BUY WAR BONDS—AND KEEP THEM



Designers and Manufacturers of Thermo-
static Expansion Valves; Pressure Regulat-
ing Valves; Solenoid Valves; Float Valves.

THE REFRIGERATION INDUSTRY

Typical of many small Dealers, this one, after years of shortages, is ready to tackle VE-Day



THE situation of the small refrigeration dealer today can be likened to a knock-down, drag-out football game. Facing a combination of lack

of goods, priorities and other war-necessary restrictions, the dealer has been fighting doggedly to maintain his prestige, hold his customers, to stay, in short, in business. For him



it's fourth down—and goal to go.

How has the small "neighborhood" refrigeration and appliance dealer survived the war? What have been his reactions to wartime restrictions that have almost put him out of business? What are his most pressing problems today and what are his plans for the future?

These questions were answered by A. W. Blankenship, who has been owner and operator of Thurstons Electric Store, Springfield, Ohio, since the owner died in 1939. Since taking over the business Mr. Blankenship has experienced three peacetime years and three wartime years in the

refrigeration sales and service business, and during this time has been "up against just about everything that could happen to a small business."

A Neighborhood Dealership

Thurstons Electric Store is located off the beaten path in the industrial city of Springfield. It occupies a frame store building in a small business district about two miles south of the "downtown" area, and is thus well out of the high rent area of the city. Classified advertisements in the daily paper carry the admonition to prospective customers, "Our location will save you money."

Prior to the war Thurstons sold about 200 Hotpoint refrigerators a year, in addition to electric ranges, washers, and vacuum cleaners. The company handled all service on the equipment sold, and in addition, operated an extensive service business on other makes of refrigerators, ranges, cleaners, and small appliances.

When merchandise was available, Mr. Blankenship encouraged trade-ins, as the shop was equipped to rebuild any used refrigerator, washer,

or cleaner. After being put in first class condition, the re-built appliances were placed on the display floor for sale . . . at a profit. It is interesting to note that while almost all washing machine and vacuum cleaner sales were on a trade-in basis before the war, only about 25% of the refrigerators sold by Thurstons were on this basis . . . indicating a vast difference in the saturation of the two markets.

"Going Along" on Service

For the past three years Thurstons has been "going along" on a service basis only. Mr. Blankenship has not attempted to do "priority business" on either household or commercial refrigeration, as his early experiences with the red tape of WPB regulations convinced him that this kind of business was not worth the trouble. Like many other small business men in America, Mr. Blankenship has acquired a hearty distaste for the red tape that has been the companion of many wartime restrictions.

Service business has been good . . . in fact too good for the limited resources of the organization. Since there has been no outside selling to

Continued on page 32

HOT *and*

COLD

This thermometer test stand has a temperature range of 103 below zero to 311 above.

REFRIGERATION engineers have been called upon to crack some pretty tough nuts in supplying testing equipment for the use of the Armed Services. This is particularly true with respect to equipment designed for testing various pieces of apparatus in the field, where what amounts to "laboratory" conditions must be maintained under widely varying circumstances.

In addition to the close temperature control required in all types of testing equipment, set-ups designed for field-testing use must be constructed with an eye to compactness, so that they may be easily moved from place to place. Also, they must be of a type which can be moved into an area and be ready for use after plugging into an electrical outlet.

Refrigeration Economics Co., air conditioning and refrigeration engineering and manufacturing firm of Canton, Ohio, recently was called on to solve some rather interesting problems of this sort in supplying a thermometer test stand for the Army Air Forces.

Temperatures Required

Specifications called for 12 test wells, to be held at various temperatures from minus 75° C. (minus 103° F.) to plus 155° C. (plus 311° F.). Temperature control had to be plus or minus 1/2° C., and the temperatures in each well had to be uniform within 1/10° C. at all points. Another requirement was that the equipment had to perform in an ambient temperature of 120° F., and without running water.

The entire unit was limited in size to 60 inches wide by 36 inches deep by 48 inches high, and specifications called for a construction that could be shipped to any part of the world, ready to plug in to the electric supply and be ready for operation.

To accomplish this, the 12 wells were placed in a steel cabinet, insulated with 8 inches of sheet cork and Santocel, and with a control compartment paralleling the six low-temperature wells. The two-stage "Freon-22" compressors and necessary gauges, starters, resistors, relays, evaporative condenser, receiver, motors, and pump were located in the base below wells and control compartment.

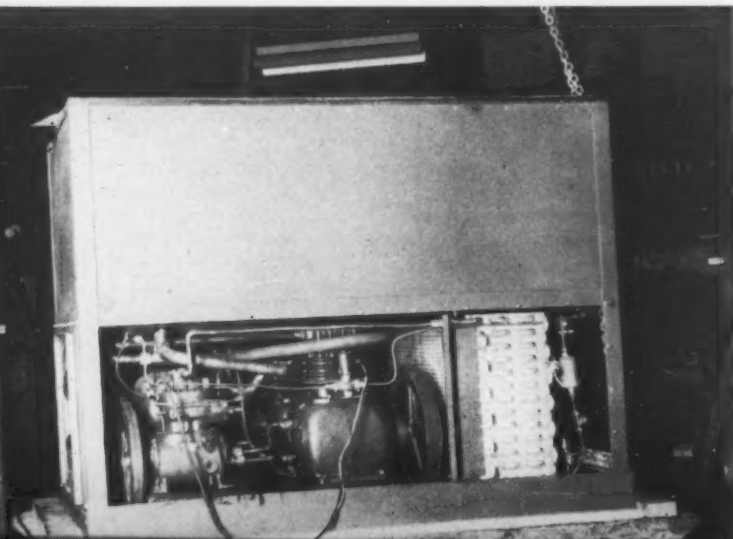
Condenser Selection

Evaporative condenser was selected to fulfill the requirement of operation at 120° F. ambient temperature without the use of running water. For this high temperature, however, it was necessary to provide water and keep the condenser pan full. For operation at moderate ambient temperature, no water was required, and the units are air-cooled. An automatic control cuts in the water circulating pump when condenser pressure reaches 180 lbs., and shuts down the pump at 150 lbs.

Temperature in each well is controlled by a Fenwal thermostat.

Machine compartment of the thermometer testing stand, showing two-stage compressors.

THE REFRIGERATION INDUSTRY



FOR THE AAF

which is guaranteed to control within $1/10^{\circ}$ F., plus or minus. For the cold wells, the thermostats work through two-pole relays to open liquid and suction solenoid valves and start the refrigerating machines.

Hot Well Hook-up

For the hot wells, the thermostats control electric heaters, which have resistors in series, since a prime requirement of the job was that all heaters be of the same wattage, and resistance was therefore necessary to prevent excessive heat to the moderate temperature wells.

A special heat exchanger was installed to superheat the suction gas to the low pressure compressor, and a liquid sub-cooler was used to further cool the liquid at intermediate pressure. Suction from this sub-cooler mixed with the discharge from low stage to prevent the second stage compressor valves from overheating.

Temperature Range

The temperatures to be maintained in the 12 test wells were as follows:

Well No.	Temperature Required
1— Minus	75° C. (Minus 103° F.)
2— Minus	50° C. (Minus 58° F.)
3— Minus	30° C. (Minus 22° F.)
4— Minus	10° C. (Plus 14° F.)
5— Plus	10° C. (Plus 50° F.)
6— Plus	30° C. (Plus 86° F.)
7— Plus	50° C. (Plus 122° F.)
8— Plus	70° C. (Plus 158° F.)
9— Plus	90° C. (Plus 194° F.)
10— Plus	110° C. (Plus 230° F.)
11— Plus	130° C. (Plus 266° F.)
12— Plus	155° C. (Plus 311° F.)

Original specifications called for a temperature of minus 70° C. (minus 94° F.) in the coldest well, and 150° C. in the hottest, but last-minute changes dropped the "low" to minus 75° C., (103° F.) and raised the "high" to 155° C.

In the words of F. M. Bennett, president of Refrigeration Economics,

"that minus 103°F. nearly sank the ship—another degree would have been impossible with the equipment furnished."

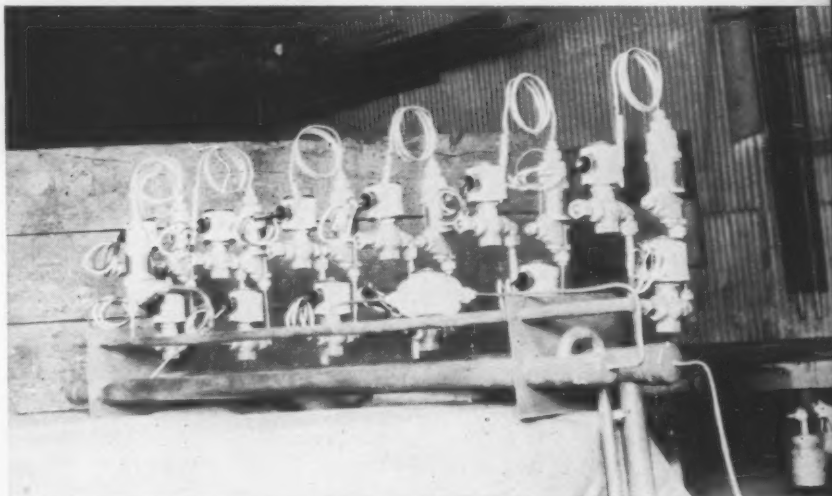
Cooling-Heating Coils

Wells No. 1 to 6, inclusive, are equipped with cooling coils, and No. 6 to 12, inclusive, with electric heaters of 100-watt capacity. Capacities

of the heaters may be reduced by electric resistance coils which are provided for each.

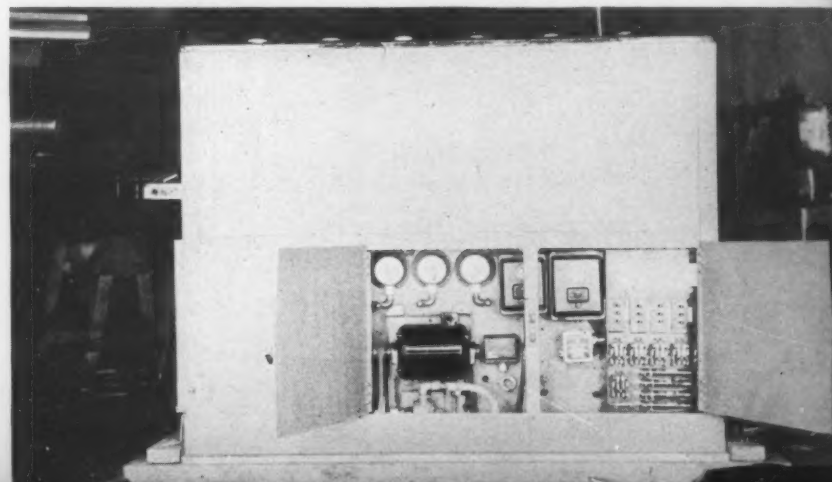
Control of temperature is by means of Fenwal thermostats, one cooling type in each of Wells 1 to 6, and one heating type in Wells 6 to 12, inclusive. Each control circuit is controlled by a snap switch, so that any

Continued on page 38

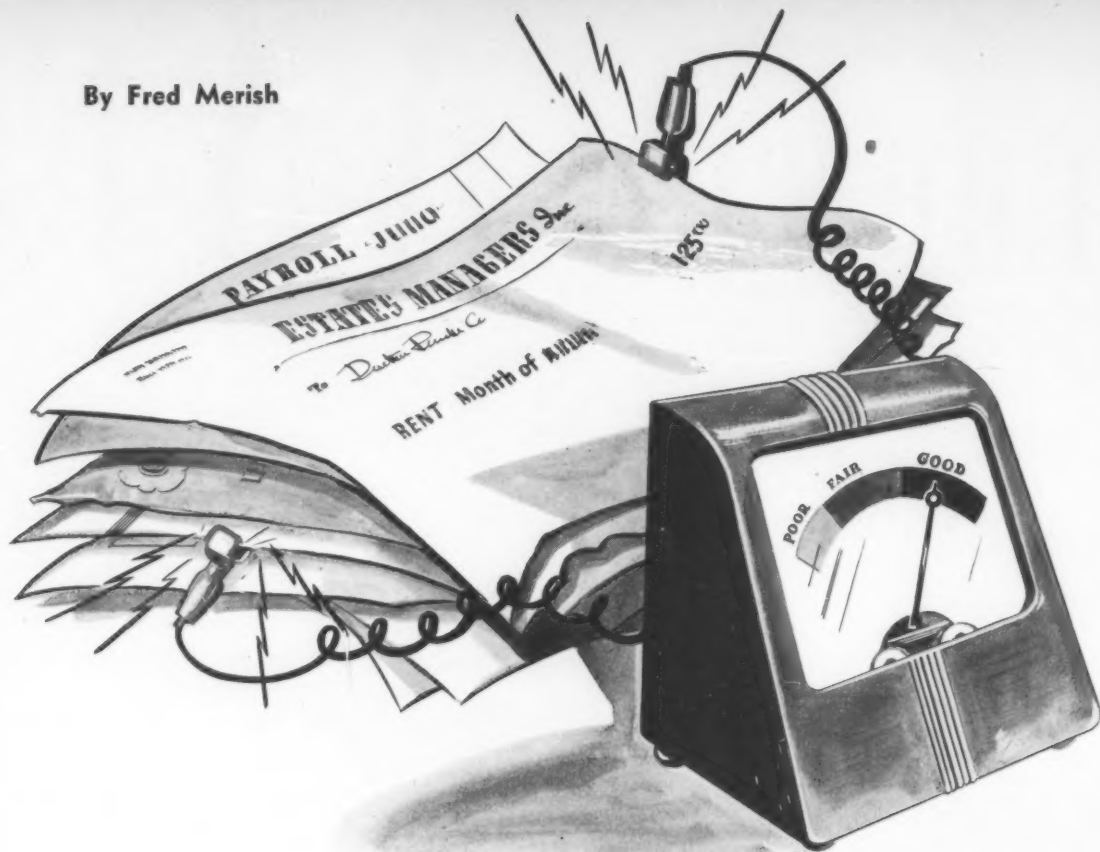


Above: control set up for refrigerant flow to the "cold" wells shown before installation.

Below: Relays, other electrical equipment, and pump are housed in a separate section.



By Fred Merish



Put A **TESTER**

"MY OVERHEAD figured 30 per cent of sales on the last profit and loss statement, so I used this percentage in computing overhead on all jobs since then. Yet the new profit and loss statement just prepared shows a net of only 5 per cent when my jobs were figured at 10 per cent net profit. How come?" So said Bill Barry, an eastern maintenance and installation man, and it poses a problem that perplexes many in the refrigeration field who use a mark-up on cost or margin on sales formula to estimate the overhead on a job.

Like most repair and installation men, Bill doesn't realize that the variance is inherent in the formula for

computing overhead on estimates, whether the selling price or the mark-up on the cost of sales is used as a basis. Maintaining an overhead ratio on the cost of sales or selling price is causing maintenance and installation men in the refrigeration field to lose substantial sums yearly because these are not always dependable formulas upon which to compute overhead on estimates.

The average installation and maintenance man in this field knows what overhead is, and that it is wise to keep it down, but he is rather naive about its under-cover operation. For this reason, we will tear it apart and show how it is geared into busi-

ness operations, and why the right percentage ratio to sales may come out wrong when you make up a profit and loss statement. Figures are deceptive unless you know just how the wheels work, and the fact that you estimate overhead profitably on paper is no assurance that you will make a profit, unless the costing formula includes complete overhead as shown by the books. If you short-cost overhead, the variance will decrease profit and show a loss.

To illustrate the fallacy of depending entirely upon the mark-up on cost or the margin on sales formula to estimate overhead on an installation or repair job, let's suppose you have

two men working on service, and your profit and loss statement for the previous 12 months showed the following costing elements:

EXHIBIT A

Sales	\$20,000—100%
Cost of labor and materials	12,000— 60%
Margin of profit on sales	\$ 8,000— 40%
Overhead expense	6,000— 30
Net profit on sales	\$ 2,000— 10%

Based on these experience figures, you estimate a job as follows:

EXHIBIT B

Labor—2 men—8 hours day—3 days—48 hours at \$1	\$ 48.00
Materials	52.80
Prime cost	\$100.80— 60%
Overhead expense	50.40— 30
Net profit	16.80— 10
Selling price	\$168.00—100%

You costed this estimate on sales in line with experience figures for the period immediately preceding, which, in this case, covered 12 months, but could have been the prior month, or the previous three, six or nine months, depending upon circumstance. Labor and materials cost, or prime cost, on Exhibit A, are 60 per cent of sales. Labor and materials on this estimate cost \$100.80, so you also consider their ratio to sales as 60 per cent.

why many installation and maintenance men are perplexed when they compute net profit at the end of a period, deducting outgo from income, to find that earnings are lower than they estimated. In search of the Gremlin, they usually go witch-hunting loss-leaks without success because operations are being managed efficiently. Profits are not up to expectations because their estimates are not properly costed.

EXHIBIT C

Labor	\$ 48.00
Materials	52.80
Prime cost	\$100.80— 60 %
Overhead expense	60.00— 35½
Net profit	7.20— 4½
Selling price	\$168.00—100 %

Overhead is based largely on time, so each worker carries a proportionate share of overhead based upon the labor-hours spent on each job. Because the books show that \$6,000 was the actual outlay for the previous 12 months and it was decided that this outlay is a dependable yardstick for the current period, an estimated overhead of \$60 on a three day job is more likely to ring the bell.

The time spent on a job determines the overhead expense, not the percentage of sales or cost. You can be compensated for your overhead out-

will change the overhead computation upward or downward, whereas your actual overhead outlay may not change. And, if it does change, it may travel in the opposite direction or vary at a different rate, all of which would give you a different net profit on the profit and loss statement from that shown on estimates for the same period.

The estimate under Exhibit B, costed on the selling price, would give this result when costed by the labor-hour method:

EXHIBIT D

Labor—2 men—8 hours daily—3 days—48 hours at \$1	\$ 48.00
Materials	52.80
Prime cost	\$100.80— 60%
Overhead expense—48 manhours at \$1.25 an hour	60.00— 30
Net profit on sales	17.86— 10
Selling price	\$178.66—100%

Two men working eight hours daily gives 16 man-hours daily, or 4,800 man-hours in 300 working days. Dividing 4,800 into \$6,000 overhead, as per Exhibit A, gives \$1.25 an hour as the overhead cost per labor-hour. Exhibit A shows that prime cost and overhead, or over-all cost, is 90 per cent of sales. On the

**Proper computation often is the difference
between losing and profit-making.**

On Your Overhead

The selling price is 100 per cent, so you arrive at it quickly by dividing 60 into \$100.80, which gives \$1.68, or 1 per cent, and 100 times \$1.68 is \$168, the selling price. The other costing elements are percentage calculations on the \$168 selling price. These ratios give \$50.40 for overhead and \$16.80 for net profit—on paper.

But Exhibit A shows that overhead is \$6,000 yearly, or \$20 a day, figuring 300 working days to the year, and this job is estimated to take two men three days, so the overhead should be \$60, which would change the foregoing figures (See Exhibit C).

This shows a net profit of 4½ per cent, not 10 per cent, and explains

lay only if labor-hour overhead cost is covered by the overhead on an estimate; and that depends, not upon the percentage of cost or sales used in the calculation of the selling price, but upon the actual overhead outlay in dollars and the normal hours of operation. Selling prices and costs vary from time to time, and these variations have nothing to do with overhead.

Fixed overhead expense remains fairly constant, regardless of changing costs or selling prices, and variable overhead expense does not follow price trends. Yet, if you estimate overhead on the cost of sales or the selling price, changing price trends

foregoing estimate, prime cost and overhead total \$160.80, which you likewise consider as 90 per cent of the selling price, so divide 90 into \$160.80, which gives \$1.7866, or 1 per cent. The selling price is 100 per cent, so multiply \$1.7866 by 100 and you get \$178.66.

Compare the estimate under Exhibit B, using the percentage to sales formula to arrive at overhead, and the estimate under Exhibit D, using the labor-hour method.

This variance is more than 5 per cent of the selling price, which, in certain cases, is enough to show a loss on a job when the actual figures

Continued on page 36

Safe and Simple WATER SCALE REMOVAL

Here are tips that will save both time and trouble in cleaning water-cooled condensers.

By G. E. Wilder

CLEANING and de-scaling water-cooled condensers is the kind of servicing job that can either be kept simple or allowed to develop into such an elaborate operation that no purpose is served except to make an essentially easy task more difficult.

For example, service men for a refrigeration contractor in one Midwestern city recently tackled a shell-and-tube condenser cleaning job by welding a 1½-inch coupling to the bottom of a wash tub, and hooking solid piping to the cold water induction line of the condenser.

They cleaned the unit all right, but a simpler—and just as effective—method, such as using a plain standpipe, would have accomplished the same work, and saved several hours' labor besides.

Here are some simple procedures for cleaning water-cooled condensers in the field, without having to go to

equipment of this type, in the interest of speedier and better work.

equipment of this type, in the interest of speedier and better work.

Copper Fin Tube Units

In cleaning evaporative condensers with copper fin type tubes, the service man should first remove the splash plates at the top of the tube bundle. After this, the solvent should be sprayed, swabbed, brushed, or poured across the tube tops. The solution will gravitate down through the tube and fin assembly.

This operation should be continued until the scale has broken up into such small pieces that it can be removed or washed out of the condenser with normal water pressure.

Spraying the solvent will speed up the job, reduce the quantity of cleaning material required, and give positive cleaning at the side of the tube bundle. For this spraying operation, many service shops report they have found the standard types of stirrup pumps or paint spraying equipment quite satisfactory.

Caution on Aluminum Fins

Special precautions should be observed in the cleaning of evaporative condensers which have aluminum fins on copper tubes, so it is important that all jobs should be checked carefully to determine if aluminum fins are used.

Some types of solvent will destroy aluminum metal. In cleaning equipment of this type, a weak solution of tri-sodium phosphate is suggested for use, with the operation being the same as that recommended previously for condensers with copper fin tubes.

A weak solution of tri-sodium phosphate will not dissolve the scale, but will loosen its adhesion and binding properties to such an extent that small pieces may be either brushed or blown from the fins. Some servicing organizations also have made use of CO₂ successfully in blowing out a job of this kind.

While the use of the method just

Continued on page 48

induction line after the cleaning operation has been started. The back-up is caused by chemical gas pressure as the scale is dissolved, and by temporarily closing the induction line this gas pressure can be utilized to force the solvent through the tubes to the discharge point.

4. As scale is dissolved, the back-up will gradually decrease in intensity. Standpipes and tubes should then be filled to the point where all scaled surfaces are immersed and saturated. The solvent should then be allowed to remain in the system until no further foaming action is observed.

Some service shops have portable hand or electric pumps with a chemical tank for this work. Usually comparatively inexpensive to assemble,

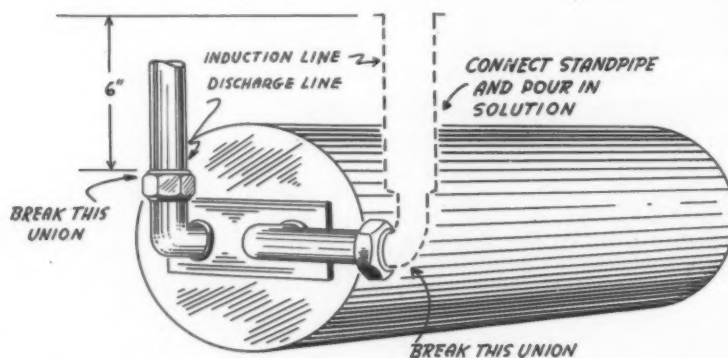


Figure 1. Method of connecting standpipe to induction line of condenser.

the trouble of dismantling them and returning them to the shop:

Shell-and-Tube Units

1. Open unions on suction and discharge lines.

2. Connect standpipes as shown in Figure 1.

3. Pour the solvent into the induction standpipe. If the tubes are heavily scaled, the solvent will back-up and discharge from the induction line.

This can be prevented by use of a temporary valve or cap to close the

this equipment materially speeds up the cleaning job by circulating the solvent faster than is possible by the expansion method. In addition, it reduces the quantity of material required for the cleaning operation.

Also, the use of a portable pump for cleaning condensers in the field means that there is practically no waste of solvent, since solid connections prevent back-up. Repair shops engaged in regular service work of this nature should obtain pumping

How to be Sure to Get **DAVISON'S** **SILICA GEL**

- ASK FOR IT BY NAME
- LOOK FOR THE DAVCO LABEL
- SPECIFY DEHYDRATORS CHARGED

WITH DAVISON SILICA GEL



DAVISON Refrigeration Type Silica Gel is designed and processed especially for the Refrigeration Industry.

It gives maximum capacity for moisture . . . gives instant and positive action . . . removes acids and corrosive compounds . . . is free from chemical action in the system . . . eliminates the hazard of dusting or powdering . . . is non-channelling—the refrigerant cannot pass through the cartridge without fully contacting the silica gel.

Eliminates moisture, which causes the large proportion of refrigeration troubles and service difficulties.

Your jobber stocks silica gel made by DAVISON in factory-charged dehydrators, in bulk for refill. *Ask for Silica Gel made by DAVISON.*

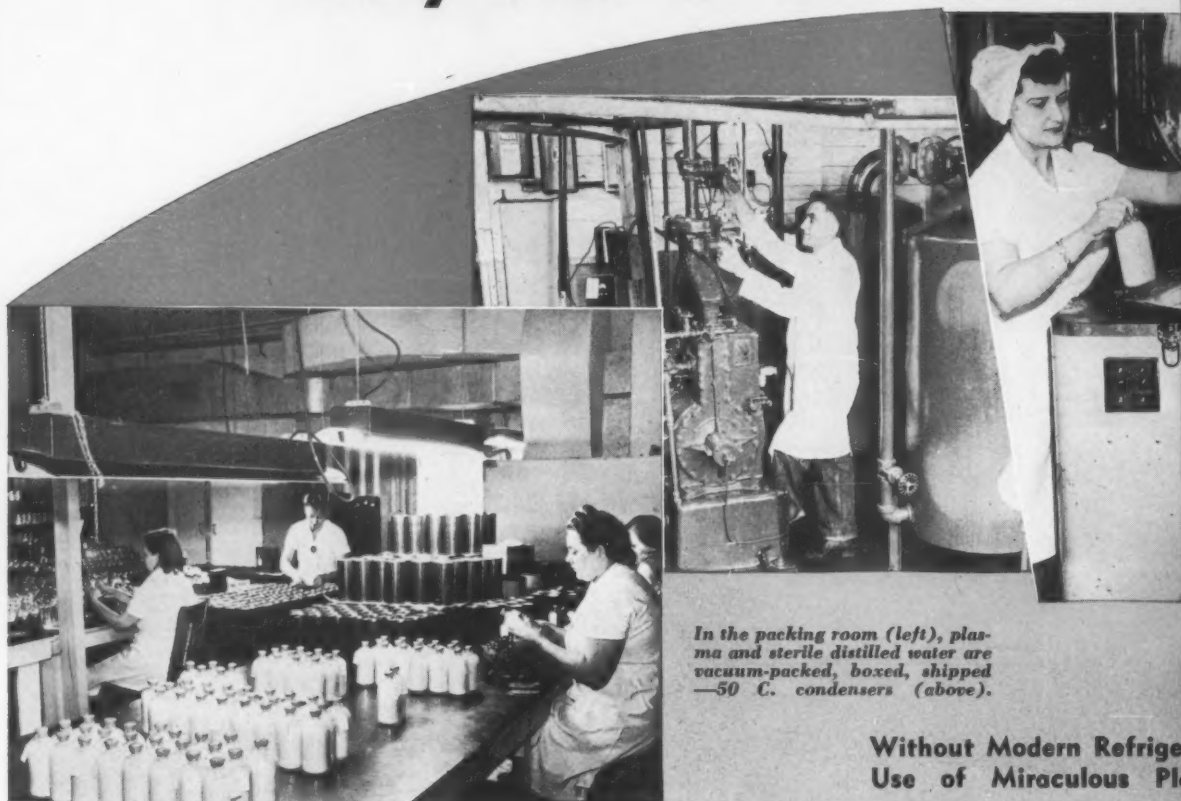
Progress through Chemistry **D** **THE DAVISON CHEMICAL CORPORATION**
BALTIMORE - 3, MD.

Canadian exclusive sales agents for DAVISON'S SILICA GEL: CANADIAN INDUSTRIES LIMITED, General Chemicals Division

Refrigeration:

Keystone of

PLA



In the packing room (left), plasma and sterile distilled water are vacuum-packed, boxed, shipped—50 C. condensers (above).

Without Modern Refrigeration
Use of Miraculous Plasma



After centrifuging (above), plasma is removed to the air-conditioned pooling and dispensing room (below). All workers in this section are masked.



By Hiram K. Smith

Associate Editor

THE REFRIGERATION INDUSTRY

THUNDER grumbled. Threatening clouds gathered, and a car slammed to a stop in the parking lot of the Bedford Ohio plant of Ben Venue Laboratories Inc. An off-duty foreman tumbled out, came into the plant on a dead run. He found no confusion, no excitement.

Faces tense and anxious, engineers and technicians were already in place. For to them a mid-summer storm was a rampaging mass of electricity on the loose, might mean power failure. And "It" had to be protected against possible loss. "It" was in seven high-vacuum ovens—812 bottles of the plant's product, a product Ben Venue workers (and all our fighting forces)

consider the most precious stuff in the world—blood plasma.

Any power-failure would mean loss of vacuum; and lost vacuum meant blood consecrated in the hearts of hundreds of good men and women, given freely by them to strengthen wounded fighters, would be wasted.

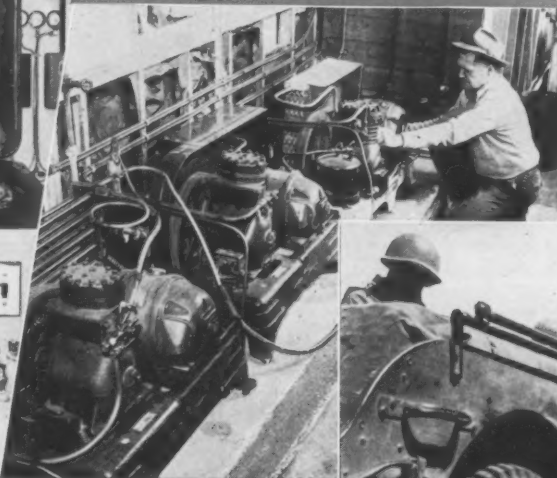
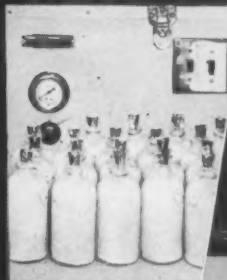
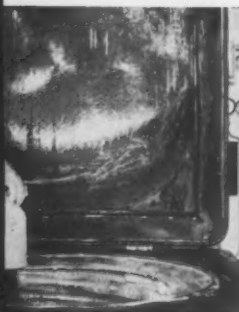
In the equipment-cluttered pump rooms the operating crew moved to positions at key valves, at switches, at the standby gasoline engine. Swiftly, with well-rehearsed smoothness, the entire organization took up emergency stations.

Suddenly a flash of dazzling brilliance illuminated the gloom outside. Compressors and pumps stopped in mid-stroke, started again as the lights blinked back on. Again

SMA

Production

Picture for The Refrigeration Industry by [illegible]



The freezer (center) delivers plasma at -60 F. Above, refrigeration man checks compressors bank. Right, plasma at the front.



**n Equipment, Widespread
Would Be Impossible.**

lightning blazed in the sky and again compressors and pumps stopped. In the unaccustomed silence, flashlights stabbed the darkness. A minute ticked away; another. Apparently this was it. This time power was off for good. Quickly, as one man slid a pump belt over to the gas engine, others spun valves connecting all condensers to a single line, cut off the heat. The battery-operated starter ground the engine to spluttering life—and now a single pump was holding the vacuum, ordinarily the task of four Stokes pumps.

When the lights came on fifteen minutes later and the compressors again started circulating their "Freon-22", condensers were switched back to

the other pumps. Condenser temperatures were still far below zero, oven vacuum was still around 100 microns, the temperature of the plasma inside the ovens still was well below zero. The batch was saved.

The brief history of blood plasma manufacture—the first package of commercially packed human plasma was produced in April 1941—is dotted with such dramatic incidents. Possibly somewhat less dramatic but vastly significant are the new techniques developed for processing and handling this new product.

New problems of air conditioning, of sterility, of low temperature manufacturing processes entered into the development of methods for mass production of plasma.

At the Ben Venue Laboratories,



In drying ovens (above), frozen serum is converted into plasma. Below, a serology is made on each donation to test its general fitness for processing.





**RAPIDLY
EMERGING**
from

PLANS to CATALOG

Through almost four years of concentration on military production—a job that has absorbed the complete capacity of the M&E plant at Lancaster—the fires of one burning desire were never fully slacked. And that was to resume refrigeration production and to bring to actuality the many fine new compressor and fin type coil products that were ready in blue print form. ★★ That day is approaching rapidly. A great wealth of experience and data on these new M&E products has already been obtained in our own extensive testing laboratories, confirming in every respect our sincere belief that M&E will again take a leading position as a quality manufacturer. ★★ We would like to put you down for one of the first of the new catalogs. Write us today!

**ATTENTION JOBBERS, DISTRIBUTORS,
MANUFACTURERS AGENTS,
CABINET MANUFACTURERS.**

Although we are not ready to make delivery it is not too early to discuss post war merchandising. Our plans are still flexible and we invite correspondence from responsible individuals and organizations interested in the sale or use of M&E refrigeration products.

MERCHANT & EVANS CO.

General Offices
2035 WASHINGTON AVE.
Philadelphia 46, Pa.



Plant:
Lancaster,
Penna.

processors of all blood collected by the American Red Cross in the Cleveland area, whole blood is brought in daily by Red Cross trucks and placed in a refrigerated room where it is stored temporarily at about 40° F. Temperature is maintained by a pair of Bush Standard Unit Coolers served by two half-ton Universal Cooler compressors. The Bush coolers are used alternately, one defrosting while the other carries the load.

Separated from this whole-blood storage room by a Jamison door is a cold room, held at about -10° F. Here frozen plasma is accumulated until one of the ovens discharges its load and is ready for another. The low temperature is maintained by one Carrier unit, and by one Bush unit, connected to a one-ton Copeland compressor. The refrigerant used for both these rooms is "Freon-12".

Since whole blood must be processed within 72 hours of collection, the bottles stored in the cool room are ordinarily moved without delay to the centrifuges, where they are spun for about an hour at 2,500 rpm, to separate the solid matter from the blood serum which later becomes plasma.

After centrifuging, the bottles are moved to the air-conditioned pooling and dispensing room where a temperature of around 68° F. is maintained by a Carrier "Weathermaker" delivering some 4,000 cfm of air cleaned by a Precipitron.

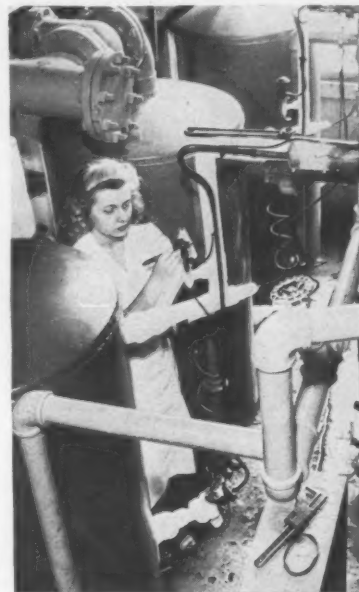
In this room sterility is the watchword; here for the first time the bottles of now-separated serum and blood solids are opened. All the women who perform these operations are registered nurses, hence familiar with the need for utmost care in sterile handling of equipment. Masks are worn to prevent contamination by airborne germs. Even THE REFRIGERATION INDUSTRY's photographer donned a mask before he was allowed to enter the room to make his pictures.

While the processing has been going forward to this point, a staff of skilled clinical technicians has been busy performing a serology on each bottle of blood. This test reveals the composition of the blood and its fitness for use in the making of plasma. The rare donations for any reason found unfit for use are put aside.

Each bottle ok'd by the laboratory is allocated to a "pool." The serum from 24 to 26 such bottles is decanted into large sterile flasks and each flask is given a pool number. Thus

constant clinical control can be maintained through the balance of the production process. Clinical tests of samples of serum from each pool continue for as long as ten days, and if any contamination becomes apparent the whole pool, by that time manufactured into plasma, is not released.

The next step, dispensing, is per-



Condensers, ovens, are checked half-hourly for temperature and vacuum.

formed by the same nurses who do the pooling. From the collection flasks the blood serum is dispensed into 300 cc bottles which have been sterilized in an autoclave. These are the bottles in which the finished plasma reaches its ultimate destination—our fighting forces.

After filling, the bottles are closed with sterile rubber stoppers and moved to the shell freezer, only one of its kind. In this machine the bottles spin constantly while the temperature is brought down to about -60° F. The Ben Venue unit, made by Therm-o-rite Products Co., is served by a four-cylinder Servel compressor of two and a half ton capacity, using "Freon-12." It usually takes about an hour for the freezer to bring a capacity load of twenty-four bottles down to the required temperature.

From the shell freezer the frozen serum is carted into the low temperature storage room and held until enough bottles have accumulated to load an oven.

The drying ovens are one of the

Continued on page 47

TWO WRENCHES In One



Look at this Bonney Tutype Wrench and see how it can save you time and bother on the job. One end is a box wrench, the other is an open end wrench. Both ends fit the same size nut, so you can use whichever type opening will do the job best—without wasting time looking for another tool.

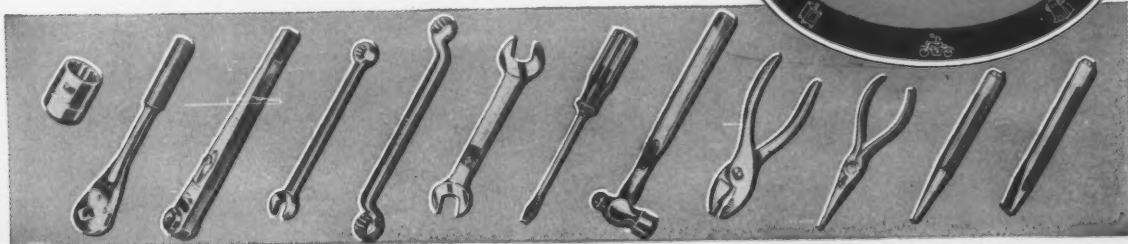
The open end of this Bonney Wrench is angled at 15° with pear-shaped head to provide greater strength and more turning room in close quarters. The box end, with thin, strong walls is offset at 15° and is pull-broached to exact size for accurate fit around the nut. The oval-shaped handle gives a firm, comfortable grip and maximum leverage.

Bonney Tutype Wrenches, made in 17 sizes with openings from $\frac{3}{16}$ " to $1\frac{1}{2}$ ", are big favorites with mechanics. Bonney Tools are sold by leading jobbers and distributors from coast to coast.



BONNEY FORGE & TOOL WORKS

719 N. MEADOW ST. • ALLENTOWN, PA.





THE SERVICE MAN'S DEPARTMENT

Tips on Touch-up. Servicemen who have had the problem of making a repair to the exterior finish of a refrigerator know the most objectionable part of spot touch-ups in the home is the time required waiting for the spot to dry before the final polishing operation. A service organization reports a new method of handling this operation which we believe is worth passing along.

The spot on the refrigerator is cleaned for spotting, and paint is applied in the usual manner, with either a spray gun or camel's hair brush. They then use an infra-red ray lamp, similar to the type used in modern drying ovens. Instead of the usual one-hour drying time, the spot can be dried in from five to seven minutes. After the drying process, a wet cloth is applied to cool the surface sufficiently so that it can be polished with a fine grade of sand paper.

This method reduces the time for touching-up a refrigerator to a point where it again becomes desirable work for a service organization.

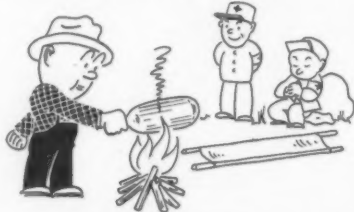
Warning. Several manufacturers of refrigerants have reported serious accidents which have occurred from overcharging and overheating cylinders. Some of these cylinders have actually split from top to bottom due to the tremendous pressure exerted when room for expansion has not been left in the drum.

When charging drums, always make sure that the drum is empty before it is refilled. Weigh the drum and be sure of the empty weight, and weigh the drum again after it has been filled and disconnected from the charging equipment, to see that it has not been overcharged. It is also good practice to shake the drum and actually feel the refrigerant flow in the

This section of
The Refrigeration Industry
is edited by
Warren W. Farr
Refrigeration Maintenance
Corporation, Cleveland, Ohio

drum, indicating that there is expansion room.

Fusible plugs or relief valves should be provided in all drums, so that the refrigerant can be vented in case of excessive temperatures. The most practical method of heating a service cylinder is to immerse it in lukewarm water, as this method will not permit the refrigerant to become overheated and create high pressures. Never heat a drum on a gas stove, or with a blow torch. Most accidents reported have resulted from this method of applying heat.



Selling Plan Service. We have discussed with a number of automobile dealers the present factory parts and service selling campaign which they have been conducting over a period of years. There are two distinct reactions to the automotive selling plan. The factories assert this plan has very definitely promoted the sale of service parts and accessories, and has substantially increased the auto dealers' parts and labor sales profits. The fact that proper service was sold, in many cases, has meant better performance of the automobiles

and satisfied users. These two points, of course, were the original intentions of the plan.

One reaction, however, was distinctly unfavorable. The users felt, in many cases, that the repair mechanics knew too much about selling parts and accessories and not quite enough about the proper adjustment on the automobile.

This plan can be used to advantage in the refrigeration service business. It has always been easy for the service man to carry on a good discussion with the average user. The owner does not expect a service representative to approach him on any selling campaign. This has a very distinct advantage, and the plan would lose its effectiveness if it were stressed to the service man exactly how to make the successful sales approach. It would be much better for the serviceman to use his own method of advising the customer of the work he would like to perform, and the parts which would be necessary to make a complete job.

Set Flat Prices

Definite lists should be compiled for use by the service man, and an established price for specified work should be determined in advance.

For example, a flat rate operation, which can be called "General Check for Proper Operation," would consist of the following:

1. Check refrigerant charge.
2. Check oil charge.
3. Test compressor efficiency.
4. Oil motor.
5. Clean condenser.
6. Adjust and remove glaze from belt.
7. Tighten pulleys and fans.
8. Tighten loose bolts and nuts.
9. Clean unit.
10. Check control.



"CLASSY CHASSIS"



Depend on Your Ranco Jobber

For all types of Pressure and Temperature Controls—commercial and domestic—depend on the advice of your Ranco jobber. He has the exact control you need, or can recommend a simple adaptation.

THE RANCO CONTROL, he means, with its good-looking construction of stainless steel base, top-frame, side-cover. Sturdy, too, for when sub-assemblies are mounted, base and top-frame are spot-welded to form one solid unit.

But interior construction counts for a lot, too, if the control is to give long-time, dependable service. In all Ranco Controls the mounting lugs, plates and studs are *welded* into place. The Overload Protection Unit's heater coil is *imbedded* in ceramic material *anchored* in exact position in solder well—no "positioning" ever has to be done by the service man. *Precision machining* of the overload latch prevents any binding.

Yes, every Ranco Control is a "classy" job. And this same quality is *built-in* with the best materials obtainable, accurately fabricated, carefully assembled and tested. You can install Ranco Controls with complete confidence that their good appearance will be matched by their dependable performance.

Ranco Inc.

COLUMBUS 1, OHIO

11. Check refrigerator temperatures.
12. Check door gaskets and seals and adjust if necessary.

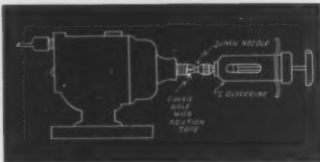
The above points should be made on every call if a man thoroughly checks the refrigerating equipment. By listing these items, the customer is inclined to feel that he is getting more service, and a definite price higher than a normal service charge can be justified if the work is conscientiously performed.

Sales Opportunities

Also, in making the suggested checks, several opportunities for selling materials present themselves. If the refrigerator is short of gas, additional refrigerant may be sold; or oil for the compressor. A separate can of the proper grade of oil for the motor can also be sold. In inspecting the belt, it may be found to be defective; or the door gasket may be worn so that it can't be adjusted and might also require replacement. The customary rush service call would not present the same opportunities for selling parts as does the above plan.

The same plan may be applied to a complete unit overhaul, which

I do it
this way...



I have found that adding glycerin to the bellows compartment prevents freeze-ups from moisture condensing and freezing.

By using a syringe, the glycerin can usually be injected through the hollow adjusting shaft, without the necessity of removing the valve from the unit.

**George D. Wiseman
Frederic, Wis.**

The Refrigeration Industry pays \$5.00 for each Service Kink published. Send in yours today.

would be a shop operation. Here the check points could be listed as follows:

1. Overhaul compressor.

2. Rebuild motor.
3. Clean up cooling coil and replace broken bolts; tighten loose bolts.
4. Tighten motor pulley and fan.
5. Install new belt.
6. Discharge refrigerant.
7. Clean condenser and receiver and recharge.
8. Replace compressor oil.
9. Install new cold control (if necessary).

List Job Materials

Also, it would be advisable to list for the customer's inspection the materials that would go into such a repair job: seal, belt, control, compressor gaskets, refrigerant, oil, motor parts, and labor. In this way, the customer has an opportunity to see the value that will go into the repair job. If the condensing unit is removed and returned without following such a plan, the customer's reaction is apt to be that the dirt was just cleaned off and the unit returned without any major mechanical repairs.

It is always good business to plan selling procedure.

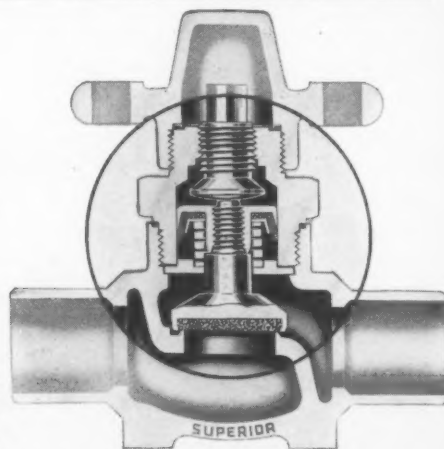
Exclusively Superior



No. 95

PRESSURE CUP VALVES

The skirt of the pressure responsive cup—acting like the piston in an automobile tire pump—automatically forms a positive pressure seal, with the valve stem in any position. Eliminates packing "drag" and leaks prevalent with conventional packed valves.



The Inside Story

1. Seal-cap gasket assures pressure-tight joint.
 2. Pressure responsive cup forms positive seal
 3. Metal-to-metal backseat when valve is fully opened
 4. Wrench flats for easy removal of internal assembly
 5. Spring assures positive opening under pressure
 6. Generous openings assure against pressure drop
- Available in sizes through 2 1/2" sweat and 2" F.P.T.
If you haven't a copy of Catalog R2, request one today.

SUPERIOR

VALVE & FITTINGS COMPANY PITTSBURGH 26, PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES • WEST COAST STOCK: LOS ANGELES (15) • JOBBERS EVERYWHERE

Control Problems Wanted!



Right Now—Minneapolis-Honeywell refrigeration engineers are ready to help you with any problem involving refrigeration equipment control. Our engineering experience and research facilities are available to assist you in the design or application of controls to your own postwar products.

Make use of this service—there is no obligation.

Minneapolis-Honeywell Regulator Company, 2909
Fourth Avenue South, Minneapolis 8, Minnesota.

Branches and distributors in principal cities.

Remember...

it was Minneapolis-Honeywell
that developed the Polartron
System of frost-free refrigeration.

MINNEAPOLIS
Honeywell

REFRIGERATION CONTROL SYSTEMS

Why the Trend Is Strong to **CHICAGO SEALS** and **VALVE PLATES**



Chicago Seals and Valve Plates make a better servicing job on all refrigerators, in less time, at less cost, at more profit . . . and more service men and more jobbers are finding out this fact every day.

CHICAGO SEAL CO.
20 North Wacker Drive, Chicago 6, Ill.

COAL TO GO . . .

Continued from page 17

do, Mr. Blankenship has worked at the service business in an attempt to keep his customer's appliances in a usable condition. He is assisted by Walter Mowen, a service man who has been with the company three years, and Russell Tasker, an apprentice service man who works afternoons after school, evenings, and Saturdays. On the basis of "two men and a boy" Thurston's has done well to repair some 1,200 appliances for as many customers in the past years. All attempts to obtain additional service men, either through the local USES or by newspaper advertisements, have been futile.

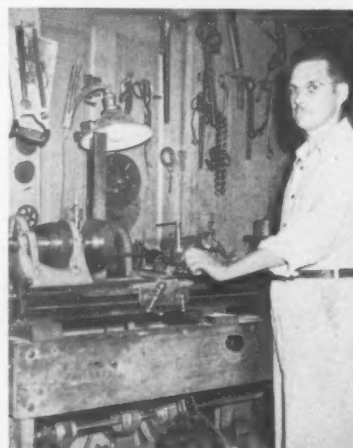
Mr. Blankenship insists that his service department operate at a profit, although he has been careful not to violate ceiling price regulations. Particularly since one of his larger competitors in Springfield either quit business because of pressure from OPA or was forced out of business by OPA, for violation of ceiling price regulations. The exact story is not quite clear, but Mr. Blankenship is

sure that his competitor is out of business . . . and he plans to stay in business.

Prices charged for refrigeration service by Thurston's are on a uniform basis according to the following schedule:

1. Labor	-----\$3.00 per hour
2. Pickup and Delivery	----- 7.00
3. Re-build 1 cylinder house-	
hold box	----- 30.00
4. Re-build 2 cylinder house-	
hold box	----- 40.00
5. Repair float	----- 15.00
6. Replace rotary seal	----- 17.50
7. Cold control	----- 17.50
8. Minor motor repairs	----- 8.50
9. Major motor repairs	----- 18.50
10. Install dryer	----- 10.00
11. Service call in city	----- 2.00
12. Service call outside city	----- 5.00

While Mr. Blankenship reports that during the war "the boys" have often



This lathe, during wartime shortages, turns out parts that can't be bought. taken home more pay than he has at the end of the week, he has been able to stay in business and keep Thurston's on a sound basis.

During the late summer the pressure of service work became so heavy that Mr. Blankenship decided that both he and his organization needed a rest. For several weeks he refused to accept new service calls from customers, and then closed the store for a full two weeks vacation. This proved to be a very wise move, as the Thurston organization returned refreshed and ready for more hard work. The customers got along somehow.

One of the most vexing problems for Mr. Blankenship has been getting enough gasoline to operate a service business. At the present time he is not allowed enough gasoline to operate the business properly, although the situation is not quite as bad as it was some time ago. When he found that

DOLE *Vacuum* COLD PLATES

Maximum Refrigeration Efficiency

for all
**REFRIGERATION
PURPOSES**

DOLE REFRIGERATING COMPANY

5910 N. Pulaski Road, Chicago 30, Illinois
N. Y. Branch: 55 West 42nd Street, New York City 18, N. Y.

the Ration Board would not allow him the gasoline required to make service calls, Mr. Blankenship instructed his customers to call the Ration Board and tell them they could not get their refrigerator or washer repaired because Thurstons did not have gasoline to make the call. After some 100-odd telephone calls from irate customers hit the local Ration Board within two days, Mr. Blankenship got his gasoline allotment, somewhat larger than the previous one, the same afternoon.

Walter Mowen reports, however, that since he has moved to a residence some 5 miles from town, he has just enough gasoline to get to and from work, and is not allowed enough to make many service calls from the store.

Right now Mr. Blankenship is "getting set" for post war merchandising. He plans to remodel the front part of his store, put in attractive window displays, and create an atmosphere where refrigerators can again be demonstrated to the customer. His present plans call for fluorescent lighting, new floor covering, new wall paper, and furniture necessary to make a real showroom. Depending in a large measure on customers who "drop in" his neighborhood store, Mr. Blankenship realizes the importance of good display facilities.

Mr. Blankenship is considering the advisability of setting up a "priority system" on orders taken from customers for new refrigerators, for post war delivery. While he feels that such a system might provide a fine backlog of business, he is afraid that certain prospective customers would accuse him of favoritism in making deliveries, and as a result, he would lose their good will. At the present time Mr. Blankenship is undecided on this point, but hopes to work out some system that will be satisfactory to everyone concerned.

On the subject of low temperature refrigerators for home food freezing and storage, Mr. Blankenship points out that the refrigerators he will sell post war must be relatively free from service trouble, and entirely satisfactory to the customer.

"People will have to learn now to use their freezers properly before they will be satisfied with them," he states, "as they will have to know how to prepare foods for freezing and how to handle various kinds of meats."

Like other appliance dealers, Mr. Blankenship is worried about how much merchandise he can get to sell after the war. He hopes that when refrigerators are again manufactured, he will be able to get 100 boxes to sell during the first year, but so far this figure is just wishful thinking, as it represents 50% of his pre-war sales. When the great day comes Thurstons Electric Store will be ready, with the showroom, the demonstrations, and the service to customers that has built the appliance industry. Mr. Blankenship has sweat it out. He's not going to quit now.

GENERAL CONTROLS EXPANDS NEW YORK OFFICES

The New York factory branch of General Controls, Glendale, Cal., control manufacturer, has moved to new and larger quarters in the Architects building, 101 Park Ave. Sales and service offices are located on the sixth floor. John Hammond is manager of the office.

Cleveland branch of the company also has moved to a new location at 3224 Euclid Ave. L. E. Wetzell is branch manager.



Make a habit of checking door gaskets on every refrigerator you repair...you'll earn more money and do a better service job. Worn or deteriorated gaskets cause heat losses ranging up to 9% on a high percentage of used refrigerators, and cost the owners money.

Jarrow Gaskets for all popular makes of refrigerators conform to original specifications...are recognized as the ideal gaskets for replacement.

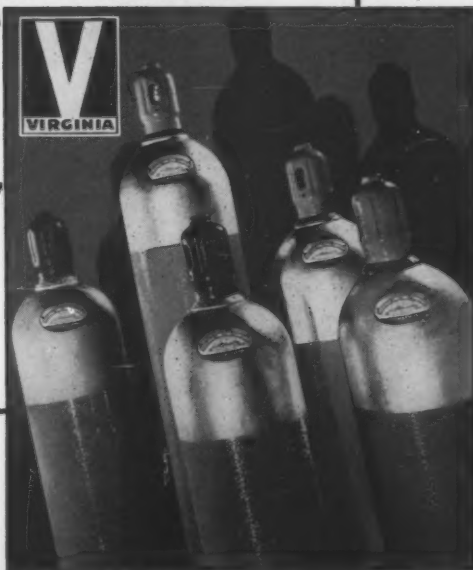
Your Jobber Has Jarrows In Stock



VIRGINIA REFRIGERANTS

—"SULFUR"
—"METHYL"
—"METHYLENE"

*Tested Purity
for
Service Surety*



AGENTS FOR KINETIC'S
"FREON-12" and "FREON-22"
VIRGINIA SMELTING CO.
WEST NORFOLK, VIRGINIA



AMINCO OIL SEPARATORS



Aminco Oil Separators protect compressors by maintaining correct oil level in crankcase and by excluding oil from refrigerant stream they enable coils, condensers, valves and dehydrators to function most efficiently.

These oil separators are made for jobs from 1/4 H.P. to 120 tons and are used everywhere, ashore or afloat, where efficient refrigeration is desired.

Full descriptive bulletins on request.

AMERICAN INJECTOR CO.

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Van D Clothier, 1015 E. 16th, Los Angeles
George Boone, Rm. 730, 1775 Broadway, New York
W. H. Cooley, Santa Fe Bldg., Dallas
Export: Borg-Warner, 310 So. Mich., Chicago

"CLEAN-A-COIL"

FOR
DE-SCALING
CLEANING

**WATER COOLED
CONDENSERS,
COOLING COILS,
EVAPORATORS.**

**NOT CLASSIFIED AS
CORROSIVE LIQUID**

*Write for Descriptive Literature
or Consult Your Local
Jobber*

Standard Solvent Co.
CHICAGO

Over the COUNTER

**Good low temperature jobs now
mean more business tomorrow.**

JIM: Boy! I'm sure going to be ready to take the rest cure if we ever get over the hump on this parts buying run. It sure beats anything I ever saw. With no new equipment going in homes, the old jobs are sure being stretched out to the last bit of refrigeration they have to give.

FRANK: Have you noticed the amount of door gasket material we've been selling lately? I got to talking with some of the boys about it, and I found out that a lot of them have been doing a good deal of campaigning of their own on selling gaskets, to stop leaky door conditions. The old jobs have about everything they can do to turn out cold with everything tight, and the leaks from bad gaskets just about put them down for the count.

Bill Jones was telling me the other day that he's been making some extra sales by calling attention to door leaks. He gives the customer a regular leak test demonstration to show how bad the leaks really are—and then all he has to do is take their order.

JIM: You said it—takin' orders for new business is the easiest thing to do these days. The boys are getting all kinds of business this year, and they're doing a swell job keeping the old veterans going.

Say, before I forget it—Tony was in this noon while you were out to lunch. He told me to tell you that the heat exchanger that you told him he ought to put on the air-cooled job that was jammed up in the closet and not getting any cool air seems to be turning the trick. He said he hooked it up, just like you told him to, in the high pressure gas line between the head of the compressor and the condenser, and ran a water line through the suction circuit of the heat exchanger.

He put a solenoid valve on the water line, connected

to the low pressure switch to handle the water supply. It was as hot as blazes when he started the job up, he says, but in no time the head pressure started to go down and the compressor began to take hold of the job and show some signs of doing things.

FRANK: I'm sure glad the job worked out that way for Tony. He was pretty low when he came in here about that job. He told me that he's been practically living with it ever since the hot spell set in, and did just about everything he could think of, but just couldn't seem to get the darned thing to put out. The toughest thing about it was that it's one of those jobs where there just isn't any other place to put the condensing unit.

JIM: Here's something else—Brownie was in a while ago to get the material he's using to install the frozen food cabinet he's putting in somewhere down in the country around here. He said he was putting an alarm bell or some such thing in the circuit so that the folks would have a warning if the job started to warm up.

We had quite a talk about the problems with frozen food jobs—you know those jobs are on the build-up now, and they just got to be right. Those babies just can't stop on you or what have you got? "Soup and smelly meat," Brownie says.

I said that if I was making any frozen food installations I'd always put good heavy fuses or some such protective device in the circuit, to take care of the times a temporary overload gets on the lines. As far as I'm concerned, that kind of protection is tops. You still get motor protection—for if the overload continues or you have

a short, the fuse will go before the motor is damaged, but the lag element will ride out the short overload and keep the job running when the ordinary fuse of the



proper size size would let go.

Brownie liked the suggestion, I guess. He took a couple of the protectors along with him, and said he was goin' to put one on the job he's on now, and on all the other low temperature freeze jobs he installs from now on.

FRANK: Is he putting a heat exchanger and oil separator on the job too?

JIM: He sure is. He said he wasn't goin' to put in any of these jobs without doin' it right. For one thing, he says, he's too busy to have to be nursin' these jobs along after they are started up; and he says that he thinks there's a great future in these low temperature installations in the small towns and on the farms, and he doesn't want any of his jobs to go bad on him and give him a bad name in his territory.

FRANK: Brownie's got the right idea, all right. You know, if everybody does a careful job on these low temperature cases and sees that they go in right, the customers'll all be happy and the business will really get up and go as soon as restrictions are taken off.

Of course, it's probably too much to expect that every job, even if it's thought out as carefully as possible, will perform without any bugs of any kind, but it's something to shoot at, anyway.

JIM: Ain't that the truth! You know, I've noticed one thing—most of the service engineers that come in here realize that their work right now, and the success of the jobs they put in, are going to play a mighty big part in a lot of the future trends in the industry.

TO MAKE TRUCK UNITS

Advance Manufacturing, Inc., Detroit, Mich., has entered the refrigeration field as manufacturers of mobile cooling equipment to be used on trucks and buses. H. O. Kirkpatrick, formerly with Motor Truck Refrigeration Co., Detroit, is chief engineer.

OPENS OWN FIRM

Ernest O. Hense, former service supervisor for Refrigeration Maintenance Corp., Chicago, has opened his own business, Air Conditioning & Refrigeration Service Co., at 6946 Stony Island Ave., Chicago.

TESTED AND APPROVED

Refrigerants FOR TOMORROW'S REFRIGERATORS



AVAILABLE IMMEDIATELY!

In large measure, the success of your automatic refrigerators depends on the efficiency and dependability of your refrigerants. Refrigerants are the "life blood" of refrigerators!

Ansul Liquid Sulfur Dioxide is an ideal refrigerant for household refrigerators, with a long and impressive record of trouble-free performance.

Ansul Liquid Methyl Chloride is recommended for small commercial units. Its performance record is equally excellent.

Backed by pioneers in the field, Ansul refrigerants are clean, dry and pure. Ansul service is friendly and deliveries are dependable. Phone, wire or write—today!

THIS TECHNICAL BOOK

(3rd Edition)

on Ansul Refrigerants is still available. If you do not have a copy, send for one. It's free.



ANSUL
TECHNICIANS ARE
REFRIGERANT-
SPECIALISTS.
CONSULT THEM
ANY TIME!

* REG. U. S. PAT. OFF.

ANSUL CHEMICAL COMPANY

Marinette, Wisconsin

Agents for Kinetic's "Freon-12" and "Freon-22"

PUT A TESTER . . .

Continued from page 21

are computed, even though an estimate seems to net 10 per cent profit as under Exhibit B.

EXHIBIT D

Selling price—labor-hour method	\$178.66
Selling price—percentage-to-sales method	168.00
Loss variance	\$ 10.66

The mark-up on cost or margin on sales formulas may not always show a loss. It all depends on the ratios used, the labor-hours spent on a job and the cost of sales, but it is unwise

to depend entirely on these formulas without using labor-hour overhead cost as a profit-tester.

Materials will fluctuate in percentage ratio, but basic overhead hourly dollar costs can be ascertained and it's important that you accept your burden on an hourly basis. Divide your hourly burden—you'll find that for every labor-dollar you paid another \$1.25 to sustain that labor.

If desired, you may cost labor and materials as per suppliers' invoices and payroll, overhead by the labor-hour method, and add your net in a lump sum or based on a percentage of sales or cost (see Exhibit D).

From our field experience, we find that too many installation and maintenance men in this field, like Bill Barry, are losing profits because they short-cost overhead with their pricing formulas. In days of greater stability, there is less danger of short-costing overhead, because once you determine profitable ratios and use them on estimates, the costing elements remain fairly fixed and the danger of variance is minimized; but today, and in the postwar tomorrow, times of instability, it's a different story. You must watch your overhead closely, not superficially.

The reason? You can't figure overhead to the penny the same as labor and materials. You know how much you pay for labor and materials, you may determine from experience figures or manuals how much labor and materials are needed on a job, and if you get the breaks, you may cost these elements accurately—but overhead is not computable in the same definite manner. It is an indirect computation, hence an approximation, so it must be double-checked to assure accuracy. The labor-hour method of computing overhead provides this double-check, and should be used on all estimates.



Refrigeration AND AIR CONDITIONING

YOU will find NIBCO WROT Fittings, return bends and tubular parts mighty useful in laying out air conditioning or refrigeration equipment. In many cases, instead of having to buy a special part, you will find what you need in our standard line...tees, elbows, couplings, reducers, adapters, crosses, return bends, hangers...more than one thousand items and sizes are listed in Catalog 613. If you do not have a copy, write for it today.

NIBCO WROT Copper Fittings

NORTHERN INDIANA BRASS CO.
ELKHART, INDIANA
VALVES AND FITTINGS SINCE 1904

Yes—Sitting Pretty, eh?

the refrigeration service business is great today. Everything looks rosy. Plenty of work—nice profits, too. But suppose you come down out of the clouds and consider the future. Look ahead to the time when there may be more men than jobs—and when service work will go to the men best qualified to handle it—not just any "handy man." Think that over and you'll understand why.



U.E.I. Balanced Training

(home-study instruction balanced with actual shop practice) in refrigeration and air conditioning is increasingly popular, not only with future-minded men young in refrigeration, but with smart "old timers." They are "sitting pretty" today, too, but they have their eyes on the future opportunities and want to be ready for them.

Their choice is U.E.I. because they know it is a school with more than 17 years of experience in training men for refrigeration and air conditioning. They know there is nothing experimental—nothing unproved—nothing newfangled or untested about Balanced Training. It works.

First step toward making certain you'll be sitting pretty in the future is to mail this coupon—NOW.

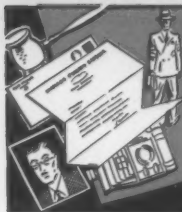
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Please give me more information about Refrigeration and Air Conditioning Training, as promised in your "The Refrigeration Industry" October, 1944 ad.

Name
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City State



About People

WILLIS STAFFORD

Appointment of Willis Stafford to the field organization of the Herman Goldberg Co., Chicago, has been announced. In his new capacity, Mr. Stafford will engage in sales engineering and development work for manufacturers represented by the com-



pany, including Ansul Chemical, Ranco, Chicago Seal, McIntire Connector, and Standard Refrigeration Co.

Prior to joining the Herman Goldberg organization, Mr. Stafford was assistant chief instructor at Commercial Trades Institute, Bloomington, Ill., training Army Quartermaster Corps personnel in refrigeration maintenance work.

J. A. CASSADY

J. A. Cassady, formerly sales engineer in the Indianapolis branch of F. H. Langsenkamp Co., parts and supplies jobber, has been promoted to the managership of the Langsenkamp organization's branch in South Bend, Ind.

F. W. SMITH

Frederick W. Smith, for nineteen months Chief of the Special Equipment Branch of the General Industrial Equipment Division of the War Production Board, will become associated with Carrier Corp. on November 1.

Prior to his association with WPB

in April, 1942, Mr. Smith was for sixteen years connected with Frigidaire Division of General Motors Corp.

B. H. McDOUGALL

Ben M. McDougall has recently been appointed field engineer for the southeastern territory of Alco Valve Co., with headquarters at Atlanta, Ga. This territory includes Georgia, Florida, South Carolina, Alabama, North Carolina, Mississippi, Louisiana and east Tennessee.

T. F. McLAUGHLIN

T. F. "Ted" McLaughlin has joined the Victor Sales & Supply Co., Philadelphia parts and supplies jobber, as sales manager, announces A. T. Holcombe, Jr. His experience in the refrigeration supply business covers everything from stock room and counter service to Harrisburg branch manager for Melchior, Armstrong, Dessau Co., with whom he started 11 years ago. Since January, 1942, Mr. McLaughlin has been associated with the airplane industry.

W. A. DOEPEL

Appointment of W. A. "Wally" Doepel as district sales manager of the Pacific Coast district for Lynch Mfg. Corp., has been announced by R. L. Sears, sales manager. Prior to



coming with Lynch, Mr. Doepel was assistant to the vice president of Thompson Products, Inc.

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is a finely-treated colored refrigerant oil which penetrates every nook and cranny of the system. The leak is indicated by a red stain—just like the discoloration on a carburetor in which ethyl gasoline has been used. Can be used safely and effectively with any type of refrigerant.

See your jobber today. If he has not stocked Visoleak write for complete information.

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8 ounce bottle	1.75
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Save 10% on

case lots	48 bottles
	24 bottles
	24 bottles
	12 bottles
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COLD PLATES

Maximum Refrigeration Efficiency

THE STANGARD DICKERSON CORP.

46-76 OLIVER STREET, NEWARK, NEW JERSEY

HOT AND COLD . . .

Continued from page 19

well may be cut out, if desired. Well No. 6 which has both heating and cooling is controlled by individual switches.

Any thermostat in Wells No. 1 to 6 will start the refrigerating machines, and open Detroit Lubricator solenoid refrigerant valves which control the supply and return to their respective well. Flow of refrigerant is controlled by Detroit Lubricator thermostatic expansion valves. Electric control is from thermostat to two-pole relay to motor starter and solenoid valves.

Refrigerant temperature in Wells 1 to 3, inclusive, is about minus 90° C., and in Wells 4 to 6, inclusive, about 18° C., the later temperature being maintained by means of a suction pressure regulator. A seventh refrigerant liquid solenoid valve is in the main liquid line, and opens when the refrigerating machinery starts. Refrigerant used is "Freon-22."

Refrigerating compressors (General Electric) are in two stages, the low stage CM-63 unit being powered by a 3 H. P. motor at 820 r.p.m. and the second stage CM-43 unit by a 1½ H. P. motor at 910 r.p.m. Each compressor motor is controlled by its starter provided with overload protection and an "on-off" automatic switch.

Novel Condenser Setup

Refrigerant is condensed by a six-row air-cooled condenser, the air being drawn through the condenser by a fan on the 1½ H. P. compressor motor. When ambient air temperature is too high for successful air cooling and condenser pressure goes up to 180 lbs. gauge, a Minneapolis-Honeywell controller starts a water pump which sprays water from the condenser pan over the condensing coil, thus converting the condenser to the evaporative type.

To make possible this type of operation, water must be maintained in the evaporator pan during hot weather. A float valve is provided for that purpose, if running water is available; otherwise, it is necessary to carry water for the purpose.

Liquid refrigerant flows from the receiver through a sight glass, a strainer, a dehydrator (by-passed), a second sight-glass, a solenoid valve,

Continued on page 42

REFRIGERATION TRAINING CLASSES IN BALTIMORE

Free day and night courses on refrigeration and refrigeration servicing have been inaugurated by the Division of Vocational Education of the Baltimore (Md.) Department of Education.

Designed to provide basic training for those interested in preparing for entrance into the field of refrigeration, advanced training for those now employed in refrigeration work, and those who desire to upgrade themselves, the program of 100 hours' classroom work includes such subjects as fundamentals of refrigeration, refrigerants, compression systems, controls, motors, domestic and commercial systems and servicing.

Classes are held at school No. 293, Howard and Centre Streets, Baltimore, each Monday and Tuesday evening. Individuals may enter any of the regular classes, or special classes may be organized for a group of fifteen or more from any one company.

DAYTON COMMERCIAL FIRM OPENS COLUMBUS BRANCH

Opening of a branch office, its third, at 243 N. Front St., Columbus, Ohio, marks another step in the growth of Morton Showcase Co., commercial refrigeration and store fixture firm which was started in 1939 by George Sanders with \$800 in cash, a few consigned meat cases, an old table and a porch swing.

Headquarters of the company are at 110 E. Fourth St., Dayton, where two large buildings are occupied. Personnel has increased from three to 17, and sales volume from \$150,000 in 1939 to approximately \$625,000 for the first eight months of this year. Besides the recently opened Columbus branch, which has a floor area of 30,000 sq. ft., the company also operates a branch in Springfield, Ohio. The three stores have a goal of \$1,000,000 volume per year.

50% SOLDER OK'D

Solder containing 50 per cent tin by weight may now be used in the manufacture, maintenance and repair of refrigeration equipment, according to the most recent amendment to the Tin Order M-43. Previously, solder with this percentage of tin was permitted only in the making of ammunition box liners.



Rema Officers and Directors are shown here during their recent meeting in Marinette, Wis. Front row (left to right) are: F. J. Hood, Ansul Chemical Co.; E. M. Flannery, Bush Mfg. Co.; A. B. Schellenberg, Alco Valve Co.; R. O. White, Day & Night Mfg. Co.; C. H. Benson, Imperial Brass Mfg. Co. Back row: R. H. Luscombe, Penn Electric Switch Co.; H. F. Spoehrer, Spoehrer-Lange Co.; J. A. Stratchan, Wetherhead Co.; R. K. Hanson, Rema secretary.

The amended order also clarifies the provision calling for certification from distributors of solders and babbitt metal. The distributor must now certify to the manufacturer that he will not re-sell to any user unless he has received the certificate from the user as required by the order.

REMA CONFERENCE DATES ANNOUNCED

Because of the many problems facing member companies if the war in Europe should end this year, the fall conference of Refrigeration Equipment Manufacturers Association will not be open to non-members, as has been the practice in all past meetings, Rema headquarters announces. The conference is scheduled for the Homestead, Hot Springs, Va., November 15-17.

One day of the meeting will be devoted to product group meetings and conferences, the second day to WPB problems—reconversion, civilian production, changes in regulations, disposal of government-owned surplus property, the electric motor situation—and the third day to marketing, sales and credit problems, jobber relations, and show plans.

NEW SQUARE D BRANCH

The Square D Co., Detroit, announces the opening of a new manufacturing plant and warehouse at 2310 Ranier Ave., Seattle 44, Wash. Walter H. Bodle has been appointed manager.

25 TRAINEES COMPLETE TOWANDA, PA., SCHOOL

Twenty-five men have completed the refrigeration service training course conducted at offices of Northern Pennsylvania Power Co., Towanda, Pa., by the local council of the National Refrigeration Service Council in cooperation with the Pennsylvania State College extension center.

E. J. McGarrell, mechanical engineer in charge of service for New York State Electric & Gas Corp., Elmira, N. Y. was instructor, assisted by Martin F. Blocher, service representative for the local power company. G. H. Ritter, merchandise manager for Northern Pennsylvania Power, is chairman of the Towanda Council.

WESTINGHOUSE TO MAKE HOME, FARM FREEZERS

Complete lines of home and farm freezers will be produced by Westinghouse Electric & Mfg. Co. after the war, according to J. H. Ashbaugh, vice president in charge of the electrical appliance division. Extent of the company's line has not yet been determined, but surveys indicate that interest at present is centered on five sizes between 4 and 40 cu. ft. capacity. A survey of locker renters, the company said, indicates that about 400,000 expect to own a home freezer after the war. Announcement of the proposed home freezer line is being made both in national magazine advertising and in the Westinghouse Sunday afternoon radio program.

Electrimatic Regulating Valves

Automatic control and regulating valves for Freon, Methyl Chloride and Ammonia. A large variety of sizes and types available for practically any refrigeration requirement.



WL water regulating valves for Freon, Methyl, or Sulphur. $\frac{1}{2}$ " orifice and $\frac{1}{2}$ " FPT. Brass body construction. Large capacity—no chatter.

WP water regulating valves are available in $\frac{1}{8}$ ", $\frac{1}{2}$ " and $\frac{3}{4}$ " FPT sizes. Brass body construction for Freon, Methyl or Sulphur. Easy adjustment.



WK water regulating valves are De Luxe Pilot Operated Modulating valves. Iron body, simple adjustment. Available in sizes ranging from $\frac{1}{4}$ " to 2" FPT.

WR regulating valves for Ammonia are diaphragm operated and highest quality corrosion resistant materials are used. Available in sizes ranging from $\frac{1}{8}$ " to 2" FPT.

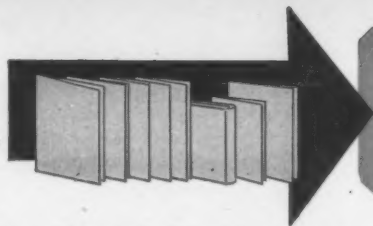


Electrimatic valves are individually tested for efficient, economical operation. Trouble free performance.

Ask for a copy of our latest catalog today.

Electrimatic

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Useful Literature

The publications featured on this page were written by experts. They are **FREE** publications. To obtain these write to **THE REFRIGERATION INDUSTRY**, 812 Huron Road, Cleveland, 15, Ohio. If there is some delay in receiving the material requested, please understand that this is due to our operating with a minimum staff. We shall put through all requests as rapidly as possible.

53—Methyl Chloride . . . a manual describing the use of methyl chloride in both household and commercial units, and listing other related technical data. Issued by Electrochemicals Division, E. I. du Pont de Nemours & Co.

54—Calcium Chloride . . . Information on characteristics and uses of calcium chloride brine. Issued by Solvay Sales Corp.

55—Anhydrous Ammonia . . . a booklet about anhydrous and aqua ammonia, containing data on chemical properties, physical properties, cylinders, handling and storage, recharging, etc. Issued by Pennsylvania Salt Mfg. Co.

56—Water Cooling . . . "Fundamentals of Water Cooling," a 40-page booklet outlining the basic theory in water cooling engineering, and detailing various aspects of cooling tower design and construction. Issued by Marley Co., Inc.

57—Insulation Manual . . . an 8½ x 11 manual published by Mundet Cork Corp., Insulation Division, covering cork specifications, drawings, and convenient heat loss chart for use in determining thickness of corkboard needed for specific temperatures.

58—Drier-Filter . . . A four-page bulletin by Automatic Products Co. on the new Trap-Dri refrigeration system protector, designed to help avoid troubles in sticky valves and clogged refrigerant lines.

59—Valves . . . A catalog describing its line of automatic back-pressure regu-

lating and capacity control valves, solenoid valves, safety relief valves, and strainers, issued by Hubbell Corp.

60—Gaskets . . . An illustrated catalog describing its line of gaskets for all types of refrigeration needs, issued by Chicago-Wilcox Mfg. Co.

61—Locker Information . . . A booklet, "The Modern Locker Plant," outlining the use of its cold plate equipment in locker storage plant applications, prepared by Dole Refrigerating Co.

62—Bulletin . . . Literature illustrating and describing the No. 605 fume kit for refrigeration service men, issued by Chicago Eye Shield Co.

63—Motors . . . Manuals (MU-7B and MU-30B) on servicing of electric motors, issued by Wagner Electric Corp.

64—Methyl Chloride . . . A 92-page manual on methyl chloride, covering practical data on this refrigerant for the refrigerating engineer and service man. Issued by Electrochemicals Dept., E. I. du Pont de Nemours & Co., Inc.

65—Flow Control . . . A bulletin (J303-2) describing its Rheotrol, a device to maintain a desired electric power or heat input, or flow of gases or liquids to any process or equipment. Issued by Wheelco Instruments Co.

66—Sanitation . . . A 24-page digest describing techniques for handling 97 cleaning, germicidal, de-scaling, rust-removing and related jobs on refrigeration and other commercially-used equipment. Issued by Oakite Products, Inc.

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condensing units

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For your home — Remember Kelvinator Refrigerators, Electric Ranges, Water Heaters and Home Freezers... they, too, are famous for trouble-free performance.

Kelvinator Condensing Units are engineered and built entirely by Kelvinator craftsmen. With a record of 30 years of trouble-free performance unsurpassed in the industry behind them, they give greater economy and years of dependable service.

HOT AND COLD . . .

Continued from page 38

a heat exchanger located in the control chamber, to superheat the suction gas to first stage; a liquid sub-cooler operating at intermediate, or second stage suction pressure; and from there through solenoid liquid and thermostatic expansion valves to the coils requiring refrigeration. A thermostatic expansion valve controls the flow of refrigerant to the liquid sub-cooler, and there is a second liquid strainer in the liquid line

after it leaves the sub-cooler. Suction strainers are located in the compressor manifold.

Pressure gauges for low, intermediate and high pressure are on the control panel, and the low pressure gauge valves should be closed when the unit is shut down, in order to protect them from excessive pressure. High-pressure cut-out is designed to prevent operation of the system at excessive pressures.

Liquids in the test wells are circulated (out at the top, in at the bottom) through means of vertical agi-

tators driven from ball-bearing line shafts by means of round rubber belts. Replacement belts have been provided for each agitator. The vertical agitator shafts run in ball-bearings encased in lignumvitae wood housing, and may be removed, cleaned in solvent and re-coiled as required.

Compressor motors, agitator motors, and water pump motors require only occasional oiling; the former, being ball-bearing, normally requires little attention. Access to the compressor compartment is through a removable panel at the back of the unit.

To protect the first stage compressor from excessive duty when cooling down the test unit, it is recommended that only one well be turned on at a time. After one well has reached the required temperature, the second well should be turned on, and this method followed until all wells are in operation. Cooling down should be started with the sixth well, and followed in reverse order, with the No. 1 well the last to be turned on, according to the recommended procedure.

In operation, it is recommended



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STORE IN COLUMBUS OHIO
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WE CARRY THE LARGEST STOCK OF FIXTURES in OHIO

MORTON CAN USE IT

We can use any quantity of merchandise.
None too large, none too small.

Write, wire or phone Now



If the equipment you are now manufacturing is essential to war production plants, housing projects, or to the armed forces, Wagner will gladly figure with you on your motor requirements. Consult the nearest of Wagner's 29 branches, located in principal cities and manned by trained field engineers.

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You should have Bulletins
MU-183 (Single-Phase
Motors) and MU-182
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Besides these two
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MU-26, MU-
30.
M44-21



Wagner Electric Corporation

4442 Plymouth Avenue, St. Louis 16, Mo., U. S. A.
ELECTRICAL AND AUTOMOTIVE PRODUCTS

that the liquid dehydrator should be shut off, by-passed, at all times unless there should be some indication of moisture in the system. During extensive shop tests of the unit, there were no indications of moisture, and special safeguards were provided to prevent such trouble insofar as possible. Failure of a thermostatic valve to open, in this installation, may indicate moisture, or a dirty strainer in the valve, or a defective power element. Failure of the valve to close might be the result of moisture or mechanical friction due to dirt, or a defective valve.

Location of the test unit in a well ventilated room is recommended, and it is suggested that condenser air be discharged outside through a reasonably short straight exhaust duct.

The test unit operates on three phase, 60 cycle, 220 volt current, and carries a 35-lb. charge of refrigerant. A special type of compressor oil also is used.

Purpose of the unit is to test the temperature control equipment upon which the Army Air Corps must depend. Each control instrument is tested at various points in its range.

Through use of equipment of this type, rapid production-line testing is possible. A master thermometer, placed in each well, enables the operator to see at once the exact temperature at which each instrument is being tested.

SYNTHETIC RUBBER FOR DOOR GASKETS

Buna-S has recently been released by the War Production Board for use in refrigeration door gaskets, reports Col. H. W. Jarrow, head of Jarrow Products, manufacturer of

this type of equipment. Gaskets using the synthetic rubber are expected to be available to the trade, through jobbers, within the next 90 days.

Reclaimed rubber has been the only type of rubber permitted for refrigeration door gaskets since early in 1942, when the original restrictions on the use of this material went into effect. Using Buna-S, gaskets will be as satisfactory as those made with crude rubber, Mr. Jarrow believes. The synthetic has a tear strength equal to crude, and resists abrasive action, greases, fats, and oils better than crude rubber.

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TO SPEED your reconversion program let Temprite Engineers help with the selection or design of your refrigeration accessories.

Whether it be the selection of standard equipment or in the design and production of special items, Temprite experience and facilities are at your disposal.

WATER COOLERS • BEVERAGE COOLERS • OIL SEPARATORS
TEMPERATURE CONTROL VALVES • HEAT EXCHANGERS • EQUALIZER TANKS

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THE ROCKET-BOMB

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But, if you demand a scientifically planned "mechanism" that carries the "bomb" to the area and cruises around until it finds the "target" (moisture), you will contact the nearest THAWZONE jobber.

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The PIONEER FLUID DEHYDRANT

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POSITIONS AVAILABLE

SERVICE MANAGER wanted by major manufacturer for domestic refrigerator department. Must have background in refrigeration and working knowledge of production and distribution methods. Must furnish good references, and be available at once. Give full details of past experience in first letter. Box E-52, Refrigeration Industry.

REFRIGERATION SERVICE MAN with knowledge of commercial refrigeration, to help develop commercial servicing department in expanding organization. Starting rate 90 cents per hour, plus commission, expense account, and car allowance. Give full details about yourself and your experi-

ence in first letter. Box E-53, Refrigeration Industry.

FIELD SERVICE MEN wanted by nationally-known manufacturer of household refrigerators. Desirable positions for men who can qualify, assured future. State qualifications and salary requirements in first letter. Box E-54, Refrigeration Industry.

SERVICE MANAGER, by prominent manufacturer of domestic electrical appliances. Should be well acquainted with washing machines, electric ranges. Immediate position with excellent post-war future. Box E-55, Refrigeration Industry.

SHOP SUPERINTENDENT. Must have ability to train and handle men. Thorough knowledge of compressor rebuilding, motor repair and general shop practice required. Permanent position, well established organization. Salary \$325.00 per month. Box E-85, the Refrigeration Industry.

REFRIGERATION SERVICE MEN—We are rebuilding our service department and have need for three experienced service men immediately. This is an opportunity for ambitious men who wish to improve themselves. We are an established growing organization, distributors of commercial refrigeration and air conditioning. From 80c to \$1.20 per hour. Transportation furnished. Qualifications first letter. Box E-86, Refrigeration Industry.

SERVICE MAN for ice cream cabinets. Must be thoroughly experienced with old and new models Frigidaire and Kelvinator equipment. Immediate position with post-war future. Top union scale \$1.25 per hour plus time and one-half over 40 hours. Annual vacation with pay. The Samarkand Company, 893 Folsom Street, San Francisco 7, Calif.

REFRIGERATION SERVICE MAN for commercial servicing and sales in expanding organization. Starting rate \$1.25 per hour; plus commission; expense account, and car allowance. Give full details and experience in first letter. Box E-199, Refrigeration Industry.

ENGINEER, experienced in refrigeration compressors and/or cabinets to expand old established business now on war work. When applying give full details as to education, experience, family, salary required. Box E-105, the Refrigeration Industry.

FOR SALE

FOR SALE: Factory rebuilt Temprites, new valves. 25 Series \$100.00—50 Series \$125.00. Surge Tanks \$15.00. Oil Heating Devices, Inc., 1835 E. 24th Street, Cleveland 14, Ohio.

EQUIPMENT WANTED

WANTED TO BUY: SURPLUS REFRIGERATION UNITS, PARTS, MOTORS, HOUSEHOLD OR COMMERCIAL. EDISON COOLING CORP., 310 EAST 149th ST., NEW YORK 51, N. Y.

FRANCHISES WANTED

SALES ORGANIZATION desires a profitable connection for the State of Maryland. We are equipped to sell a deep freeze unit to be used in the home. Background:—we have our own building; rated in Dun & Bradstreet's; have 17 years experience. Financially capable of handling any sales proposition. T. K. Sanderson Organization, 200 E. 25th St., Baltimore, Md.—18.

MANUFACTURERS!

Do you now have authorized service facilities in Boston and Metropolitan area? And if so, will they be satisfactory for the post war business you are planning? If not, now is the time to get set.

Our firm have been service specialists for eighteen years and serve an area of two million people. We are well financed and have competent employees and ample facilities, shop space, trucks, stock rooms, etc. to do a fine job for you. We are familiar with air conditioning, domestic and commercial refrigeration, low temperature applications, including ice cream freezing and food freezing. We can offer complete service from application engineering to warehousing, delivering, installing and servicing on all kinds of refrigeration or other major appliances. We would appreciate an opportunity to discuss the possibility of making our service department YOUR service department.

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THE REFRIGERATION INDUSTRY



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Beginning at once, with pleasure we are reserving this department for free **POSITIONS WANTED** ads of honorably discharged men and women of our armed forces. *The Refrigeration Industry* reserves the right to edit copy. The ads will run for one issue only but may be reinserted from time to time at veteran's request. **VETERANS:** Send your name, address, service unit and serial number and a description of the kind of job you're interested in (dealerships, sales, service) to Classified Advertising Department "b", *The Refrigeration Industry*, 812 Huron Road, Cleveland 15, Ohio.

THE PRACTICAL REFRIGERATION ENGINEERING MANUAL and REFERENCE LIBRARY

IV. AFTER TOTAL REFRIGERATION LOAD HAS BEEN DETERMINED, THE NEXT STEP IS TO SELECT EQUIPMENT FOR THE JOB.

CHAPTER IV. (Cont.) . Condensing Units

(Continued from September issue)

By
Harold Smith

AUTHOR'S NOTE:

This Manual has been written expressly to meet the needs of the many workers in refrigeration who do not have formal training in engineering.

The engineering information in these articles has been assembled from the many books on refrigeration already available. It is presented in a manner designed to enable any man with a reasonable working knowledge of refrigeration to properly select equipment for satisfactory operation and results.

All essential data—factors, rules, tables—has been combined for quick, simple reference and usage.

While these manuals do not constitute a complete course in refrigeration, attention to and use of the information presented will enable the service man to work out specifications for most types of applications.

At a later date, it is planned to provide binders for these articles, so that they may be kept in handy book form.

CLOSE temperature differences between evaporating temperatures and refrigerating temperatures allow the use of smaller condensing units, but require larger evaporators (coils) and give higher humidity in the refrigerated space. Wide differences between evaporating temperatures and refrigerating temperatures call for the use of larger condensing units and smaller evaporators (coils), and lower the humidity in the refrigerated space. Usually high humidity is desirable, to prevent drying out of the products being refrigerated. Summer air conditioning calls for low relative humidity, to produce comfort by removing moisture from the air.

In most instances it is possible to lower the initial cost of equipment by using a smaller condensing unit and larger evaporators, and this also tends to lower the operating cost. Consequently, higher evaporating temperatures offer practical

advantages, and produce savings in investment and operation. A condensing unit must always be of sufficient capacity to produce the refrigeration needed with intermittent cycles of operation, and with a maximum running time of 18 hours or less in a 24-hour period. To better illustrate the above discussion, refer to the tables below.

As an example, we will use a refrigeration load of 12000 B.T.U.'s, refrigeration temperature 35° F., 16-hour operation. Looking over the capacities of the listed compressors, keeping in mind to use the higher evaporating temperatures, we find that the 1½ hp. unit at 20°, capacity 12,500 B.T.U.'s, satisfactorily meets the requirements. The refrigeration room temperature is 35°, condensing unit evaporating temperature 20°, temperature difference (T.D.) 15°. An evaporator with a capacity of at least 12,500 B.T.U.'s at 15° T.D. should be used

Table of Temperature Differences

Refrigeration temperature	35	35	35	35	35	0	0	0	0	0	-10	-10
Temperature difference (T.D.)	10	15	20	25	30	10	15	20	25	30	25	30
Evaporating temp. degrees F.	25	20	15	10	5	-10	-15	-20	-25	-30	-35	-40

Capacity Table for Various Sizes of Condensing Units

B.T.U.'s 1 hr. at several evaporating temperatures: Air-cooled units.

	2 H.P.	1½ H.P.	1 H.P.	¾ H.P.	½ H.P.	¼ H.P.
25 degree	18200	13900	10850	8400	5025	3625
20 "	16350	12500	9750	7550	4500	3270
15 "	14600	11150	8650	6750	3975	2860
10 "	13750	10500	7800	6075	3525	2500
5 "	11500	8000	6850	5300	3030	2120
-10 "	11000	8125	5500	4500	2560	1620
-15 "	9650	7100	4850	3925	2230	1400
-20 "	8150	6100	4050	3300	1850	1160
-25 "	6010	5275	3375	2800	1565	960
-30 "	5775	4450	2700	2300	1280	760
-35 "	4890	3800	2300	1915	1050	610
-40 "	4000	3150	1900	1525	820	460

a ration certificate from his county farm rationing committee. To obtain the cooler, or to replace one sold in this way, the dealer can apply an AA-3 to his order. If he wants additional inventory, however, he must use either WPB-547 or WPB-541.

Schedule "A", which has been added to the revised order, gives production quotas for each type of equipment covered by L-38. Those types which may not be made now have a "zero" quota, which may be modified to allow production when materials and parts become more plentiful.

L-38 equipment is specifically subject to the "spot

as the low side equipment.

The 2 hp. unit also could be selected for this application. Using this unit, the evaporating temperature would be 10°, capacity 13,750. The refrigeration room temperature would be 35°, condensing unit evaporating temperature 10°, temperature difference (T.D.) 25°. Because of the wide temperature difference, a smaller evaporator with capacity of at least 13,750 B.T.U.'s at 25° T.D. would be used.

The wider temperature difference and lower evaporating temperature would have a tendency to freeze the moisture within the refrigerated space, and dehumidify the air, reducing the relative humidity and drying out the product being refrigerated. Considering all factors, the 1½ H.P. unit at 20° evaporating temperature and coil operating on 15° T.D. would provide a more satisfactory installation.

Using the example we have been developing in the previous chapters: the service cooler 8' x 10' x 9', with a total refrigeration load of 5589 B.T.U.'s (18-hour operation) or 6288 B.T.U.'s (16-hour operation), let's select the proper condensing unit to be used. The refrigeration temperature is 35°.

Referring to our capacity chart, we find that none of the units listed has a capacity of 5589 B.T.U.'s except at low evaporating temperatures. The ¾ H.P. unit has 6075 B.T.U.'s at 10°, and the 1 hp. unit would have around 5589 B.T.U.'s at -9°. The service cooler will refrigerate many products seriously affected by dehydration, so we should not use too wide a T.D. and a low evaporating temperature.

Considering the load on 16-hour operation (6288 B.T.U.'s 1 hr.), we

find that the ¾ hp. compressor has a capacity of 6345 B.T.U.'s at 12° condensing temperature and 6750 B.T.U.'s at 15°, so that it is the proper one to use on this application.

The refrigeration temperature is 35°, and we wish to maintain a high humidity condition in the cooler, so we will operate on as close a T.D. as possible and select an evaporator with a capacity of around 7500 B.T.U.'s, or approximately 10% more than the condensing unit at 20° T.D.

The specifications are: refrigeration temperature 35°, condensing unit evaporating temperature 15°, Temperature differential 20°. If the load figures as estimated are correct, the hourly load is 6288 B.T.U.'s 1 hr. on 16-hour operation or 100,608 B.T.U.'s for a 24-hour period. The ¾ hp. condensing unit capacity is 6750 B.T.U.'s 1 hr. at 15° evaporating temperature. Total daily operating time, in intermittent cycles, would be slightly under 15 hours. The adjusting procedure to effect an evaporating temperature of 15° will be explained in later chapters.

Never attempt to increase the capacity of the condensing unit by increasing the speed of the compressor, without consulting the condensing unit manufacturer. While this is frequently done with no noticeable difficulty, it is more often the cause of considerable trouble, particularly from a standpoint of overheating the motor and breaking head valves. There are cases where better specifications can be had by this practice, and if it is safe to make the corrections the manufacturer will approve the change.

authorization" procedure, but the use of condensing units, compressors, or controls in production allowed under this procedure must be obtained from excess stock under Priorities Regulation 13 or from manufacturers' stock with a Z-1 allotment symbol.

FROZEN FOODS

EXPANSION of the Birds Eye-Snyder division of General Foods Corp. after the war is expected to find frozen foods the top volume line of the company. Greater variety of frozen foods is contemplated by the company, and plans are reportedly under way to quick-freeze an extensive line of cooked foods, permitting complete meals of frozen foods.

T-LOANS

Uniform procedures for Federal Reserve bank guarantee of termination loans (T-Loans) made by commercial banks to contractors whose war contracts are cancelled have been prescribed by R. H. Hinckley, Director of Contract Settlement.

T-Loans enable any war contractor to convert into cash at his local bank approximately 90 per cent of the sound value of his war assets frozen by contract termination. The lending bank, in turn, is protected on its loan by a Federal Reserve bank guarantee. Subcontractors, as well as prime contractors, are eligible.

The procedures were set up by a committee made up of representatives of the War and Navy departments, U. S. Maritime Commission, and Federal Reserve Board.

To speed up the granting of small loans in the field, the Federal Reserve banks, as fiscal agents, have been authorized to approve T-Loan guarantees totaling \$500,000 or less to a single borrower.

LITHIUM

Reduced military demands for lithium have created surplus stocks, so that this chemical is now available to users in larger amounts and for new uses.

Lithium compounds are used by the refrigeration industry for dehumidification and air conditioning. There are four principal producers of the product in the U. S.

BLOOD PLASMA . . .

Continued from page 26

most interesting features of the plasma-producing process in use at Ben Venue. When, in large racks, the bottles of frozen serum are placed in the ovens, their temperature is around -16°F. to -18°F. The process depends upon holding a 150 to 50 micron vacuum inside the ovens while steam at about 300°F. circulates outside.

All ovens are equipped with thermometers and Stokes gauges to register the vacuum. How to obtain a constant check on the temperature of the frozen serum in the bottles, inside the oven, was one of the problems that temporarily stumped Ben Venue technicians. They solved it by making use of frozen serum which had been set aside as unusable.

Through rubber stoppers in each bottle they inserted fine copper wires, attached a common male plug to the outside end. Then they placed a female plug in each oven, connected it to wires running through a rubber stopper jammed into a tube in the top. When a batch of serum is placed in an oven, the wired bottle is plugged into the female plug—and a potentiometer reading is made on each oven simply by closing a switch.

At the start of the run the heat is built up gradually; a vacuum, serum temperature and oven temperature reading taken every half hour. Vacuum and oven temperature increases steadily, while the serum in the bottles remains well below zero until the critical stage is reached. At this point the frozen serum becomes a fine, dry, tawny powder—plasma. At the same time its temperature rises to about 50°F. , the vacuum now reads about 50 microns, and the batch is ready to take out of the oven. The length of the complete cycle depends upon the vacuum and cooling set-up.

Four of the ovens, for example, are handled by three condensers cooled by "Freon-22," using three two and a half-ton Kelvinator compressors. Vacuum for this group of ovens depends on two 225 cu. ft. Stokes pumps. Condenser temperature runs as low as -50°C. under ordinary conditions. Defrosting is done at the end of each oven run, which, in the case of these ovens, lasts about thirty hours.

Two of the seven ovens are connected to two dry ice-alcohol con-

densers which get down to about -70°C. The run for these ovens lasts about 25 hours.

The seventh oven is served by two condensers cooled by "Freon-22" (the compressors are two and a half-ton Kelvinators). This oven holds 140 bottles of serum as compared to the 112-bottle capacity of the other six, and its run cycle lasts about 26 hours.

The dried plasma—its moisture content is only about a half of 1%; in use it dissolves in water in about 45 seconds—is taken from the ovens to a capping and sealing room, conditioned with sterile air.

Capped and sealed, the bottles are carted to the packaging room. Here each bottle of plasma is placed in a metal container, together with lengths of tubing and sterile needles, and vacuum sealed. A bottle containing 300 cc. of distilled, sterile water is placed in a similar container together with the requisite tubing and needles, and vacuum sealed also.

To make the standard field kit one container of plasma (250 cc.) and one container of water are packaged in a carton equipped with a water-resistant liner. In sturdy boxes, the cartons are shipped to the fronts.



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described will not result in an absolutely thorough cleaning job, it will materially improve operation of the equipment, and there is no danger of damage to the aluminum metal, as might be the case if a strong acid or alkaline cleaning agent were used.

In removing water scale, pure acids in concentrate form have a high efficiency. However, the use of these materials in many instances is highly specialized, and presents peculiar equipment and safety problems. Many shops use materials of this nature, which are classed as "corrosive liquids," without checking to make certain that they have insurance specifically covering accidents or damage which may result from their use.

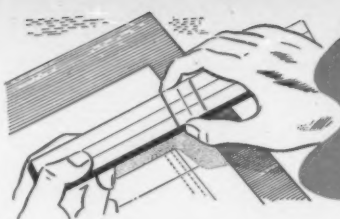
To determine the classification of the material being used as a de-scaling and cleaning agent, inspect the shipping containers. If the material is classed as a corrosive liquid, the containers will carry a white diamond-shaped label with the following legend:

"Caution—Acid—Poison—Do Not Breathe Fumes."

In making use of such materials in his shop cleaning work, it is important for the operator to keep in mind that the standard forms of shop insurance do not cover workmen's compensation, property damage or public liability hazards which may be involved in the use of the so-called "corrosive liquids" in cleaning.

In removal of grease, oil, lint and dust—fouling materials which are not held in solid form by water scale—alkaline solvents work quite satisfactorily. Caustic soda, soda ash, and tri-sodium phosphate in various mixtures are in wide general use for this type of work.

Many of the better equipped servicing shops have tanks which are equipped with heating elements, and use hot solutions for difficult cleaning operations of this nature. Carbon tetrachloride also has been used successfully for this particular type of work. In using this material, however, it should be kept in mind that fumes from it are classed as toxic, and specific insurance coverage should be obtained by the employer for his protection in case of accidents.



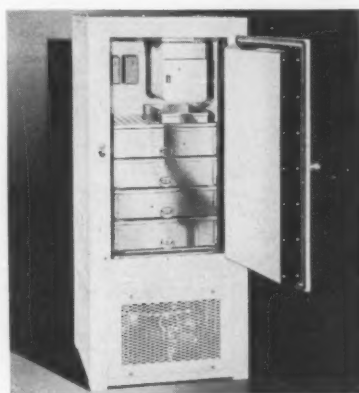
New
PRODUCTS

Splash-Proof Motor

Form J splash-proof motors are now being made by Century Electric Co., St. Louis, in sizes from 1½ to 15 hp., with two-way ventilation. The cooling air is drawn in through baffled openings in the bottom of the end brackets by a fan on each end of the motor, blown through and around all parts of the motor, and out through louvered openings in the side of the frame below the centerline and at the bottom.

Airplane Refrigerator

A compact, custom-built refrigerator for airplanes is a new product of the Airtemp Division of Chrysler



Corporation. The compact 4¼ cubic foot unit requires less than 3.5 square feet of floor area. Net weight of the unit is 106 pounds. The Airtemp radial compressor features include superfinished vital moving parts and removable cylinder liners. The refrigerant used is Freon 12. The compressor is driven by a 1/5 H.P. electric motor of the special light weight aircraft type connected to the compressor shaft by V-belt. This 1725 R.P.M. shunt wound motor operates on 24 volt direct current but a dual voltage system is available which makes provision for the operation of the refrigerator, not only on 24 volt direct current, but also on 110 volt alternating current. This means that

when the plane is in the air the refrigerator operates from the plane's electrical system and on the ground it operates from commercial current when such current is available. Other construction features include an automatic expansion valve of the adjustable type; back seating type suction and discharge valves, fitted with seal caps; a 4-blade aluminum condenser fan directly connected to the motor shaft; and a condenser coil of finned tube construction made entirely of aluminum.

Enclosed Ceiling Coils

A new series of "Spasaver" ceiling-type horizontal coolers for cold rooms and large refrigerators has been introduced by Drayer & Hanson, Inc., Los Angeles. The units are housed in white enamel cabinets.

Models in 10 different sizes are available, designed for use in institutions, restaurants, food processing plants, and similar applications where cleanliness and sanitation are important. The coolers are suitable for all refrigerants, it is said.

Units have new type propeller fans designed to reduce noise. Coils are of fin and tube type, equipped with kinetic type refrigerant distributor. Motors are totally enclosed, slow speed, ball bearing type, 115 volt, single phase.

Small Motors

A new line of shaded pole, totally enclosed electric motors of from 1/125 to 1/25 H.P. incorporating a pressure-locked, resilient rubber mounting has been introduced by the A. G. Redmond Co., Owosso, Mich. Known as the type "T" Micromotor, all base-mounted models use the new mounting, consisting of two rubber pads, two spring steel lock rings, and a base welded into a single rigid unit.

Patented "flush-weld" rotor design is used. Frame is a three-piece die cast design carefully machined to insure correct alignment of parts after assembly.

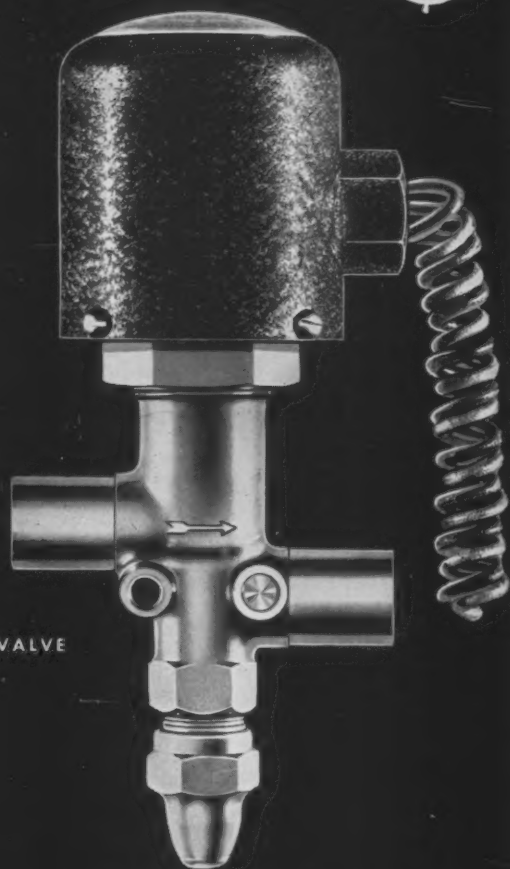


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- 1 BOND COMMITTEE**—Appoint a 6th War Loan Bond Committee from labor, management and each representative group of the firm.
- 2 TEAM CAPTAINS**—Select a team captain, for each 10 workers, from men and women on the payroll—but not in a supervisory capacity. Returned veterans make most effective captains.
- 3 QUOTA**—Set a quota for each department and each employee.
- 4 MEETING OF CAPTAINS**—Give a powerful presentation of the importance of the work assigned to them. Instruct them in sales procedure. Have them carefully study the Treasury Booklet, *Getting the Order*.
- 5 ASSIGNMENTS**—Assign responsibilities for:
 - (a) Music, speeches and announcements of the opening rally.

- (b) Pre-drive letter to employees from management and labor.
- (c) Competitive progress boards.
- (d) Meeting schedules, etc.

- 6 CARD FOR EACH WORKER**—Dignify each personal approach with a pledge, order, or authorization card made out in the name of each worker. Provide for a cash purchase or installment pledge. Instruct each captain to put a pencil notation on the card to indicate the subscription he expects to solicit from each worker.
- 7 RESOLICITATION**—People don't mind being asked to buy more than once. Resolicit each employee toward the end of the drive in a fast mop-up campaign. Call upon your State Payroll Chairman; he's ready with a fully detailed plan—NOW!
- 8 ADVERTISE THE DRIVE**—Use all possible space in the regular media you employ to tell the War Bond story.

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